

FIGURE 1

05918687.073704

0691667.07204  
1979/07/29

Cleave tags

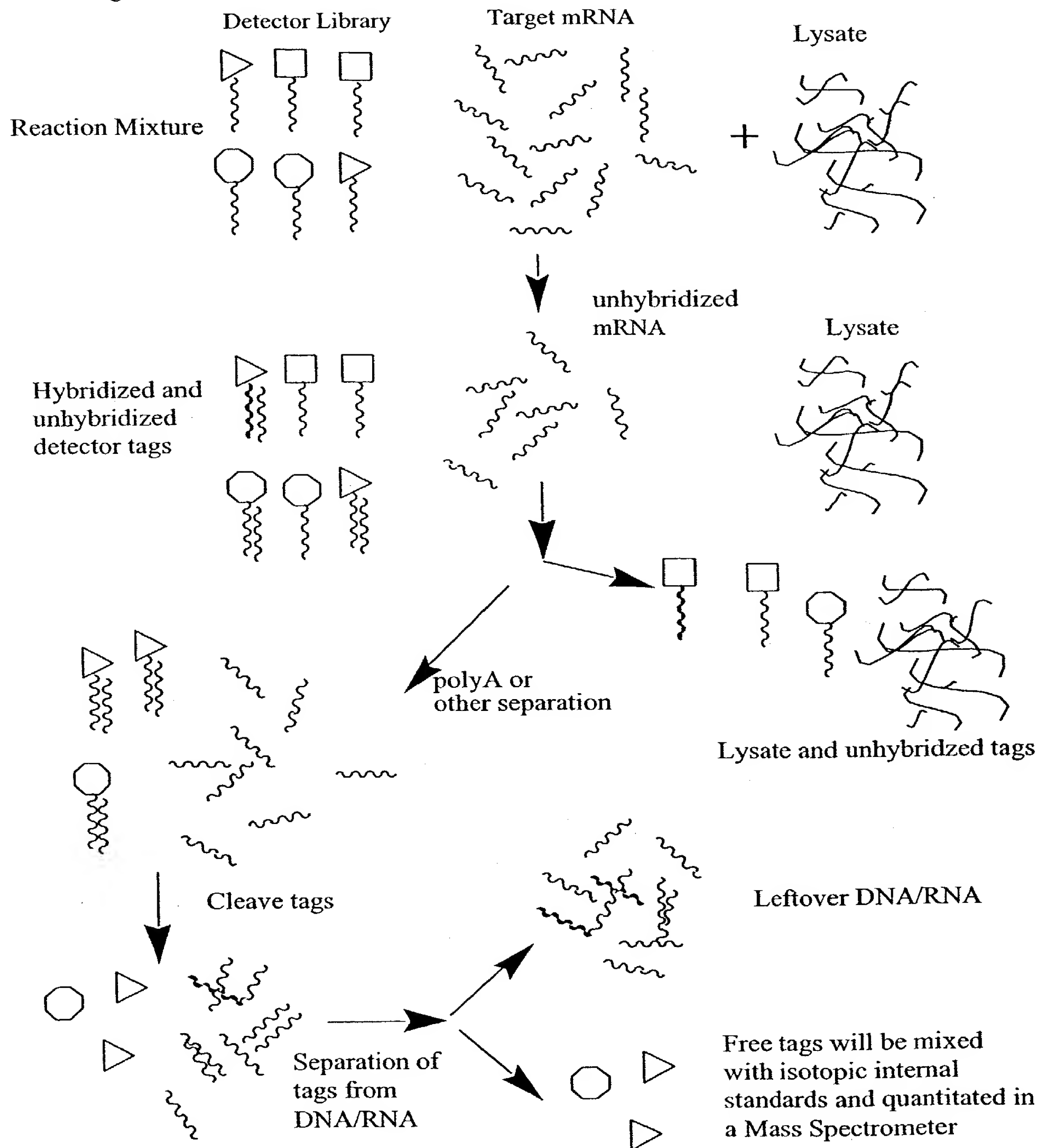


FIGURE 2

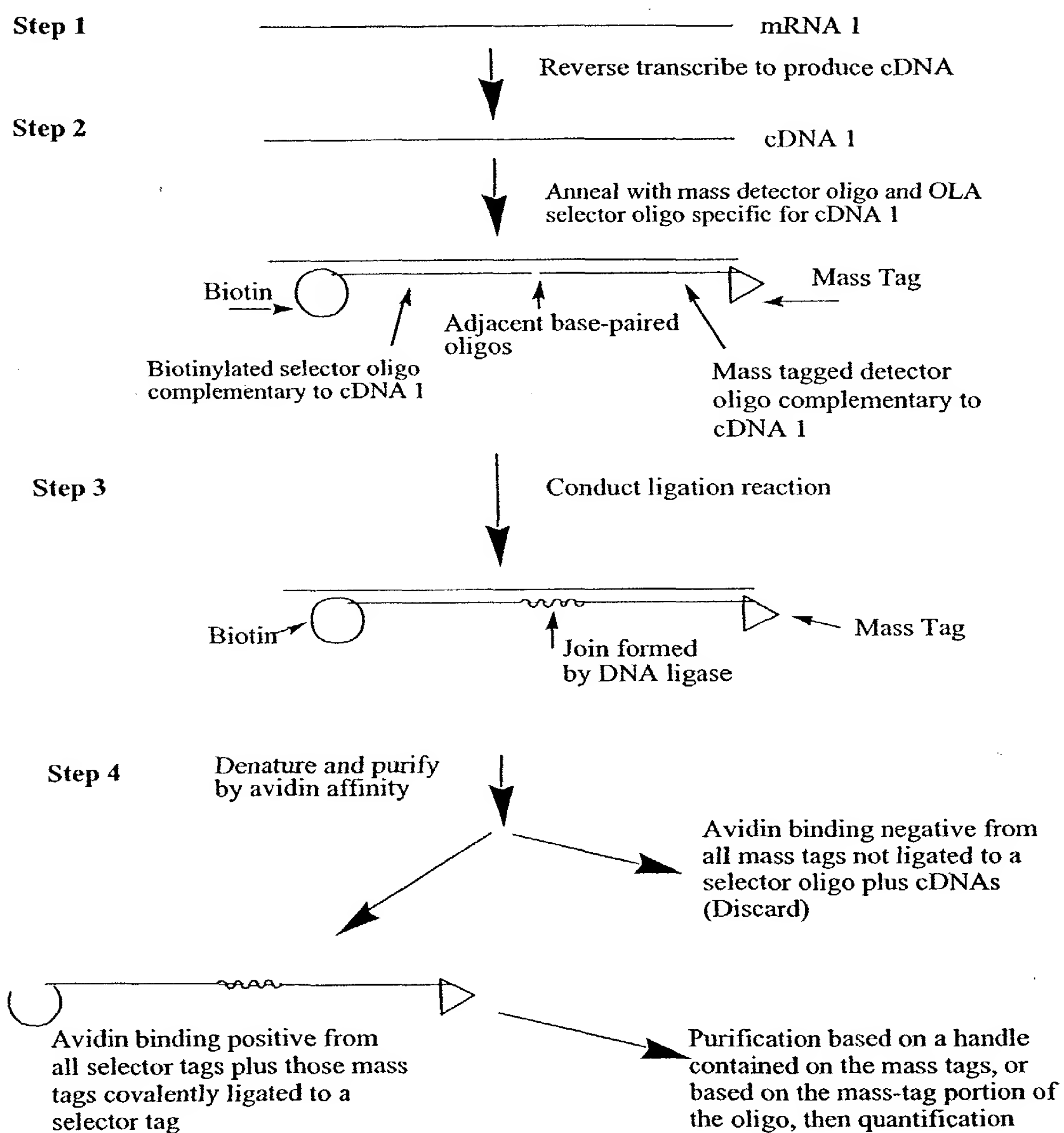
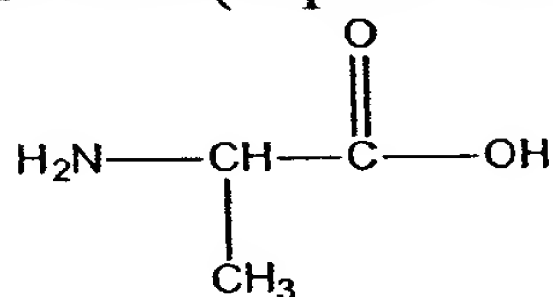


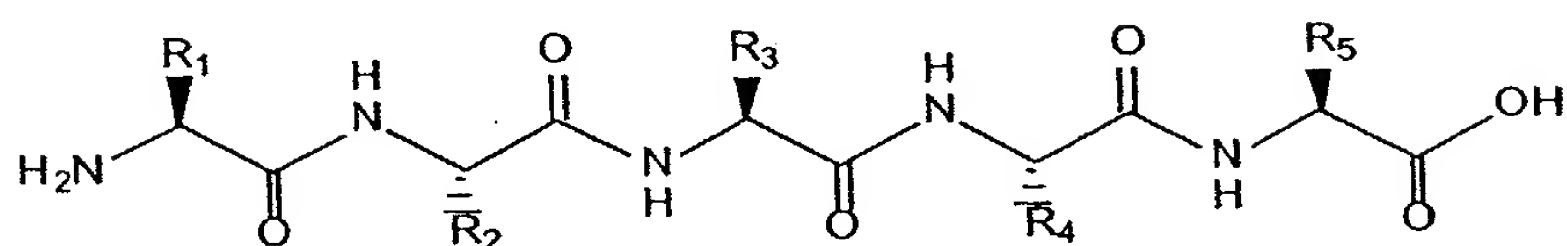
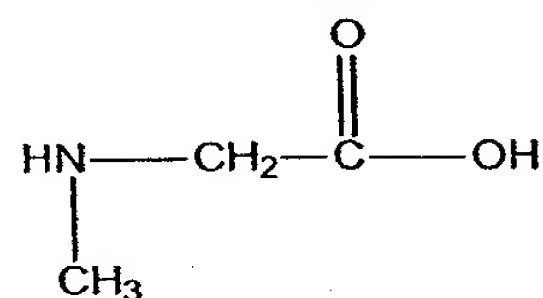
FIGURE 3

alanine (Peptide monomer)

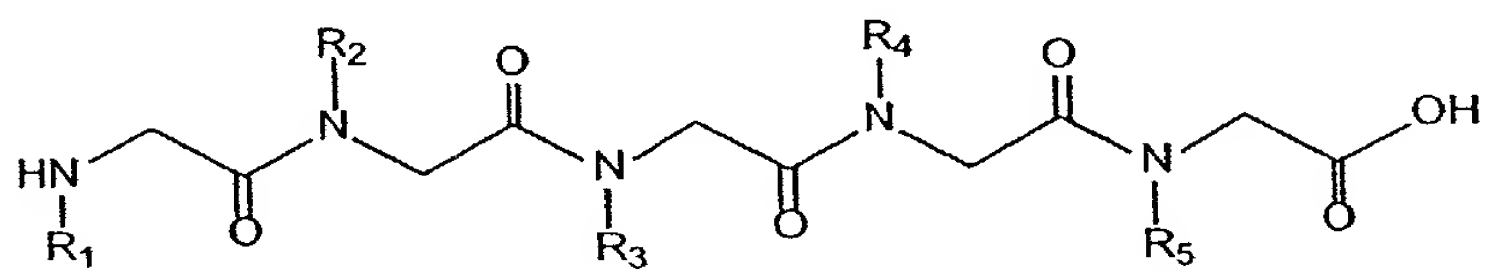


vs.

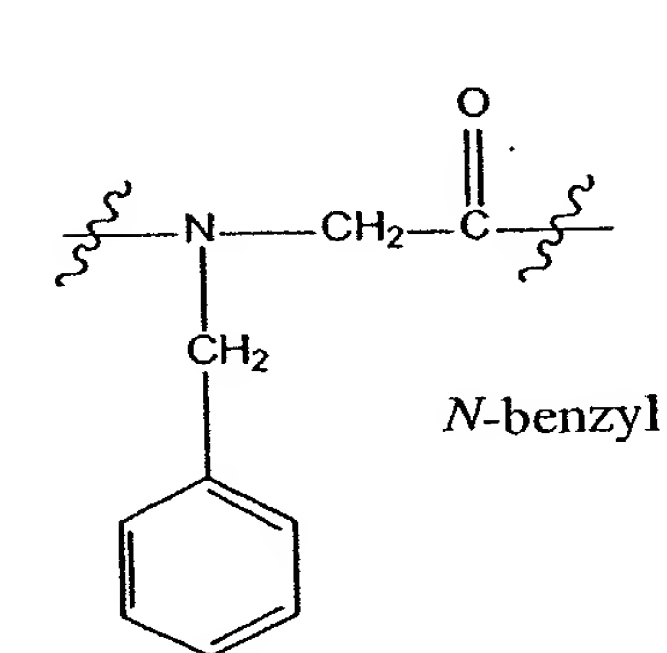
Sarcosine (Peptoid monomer)



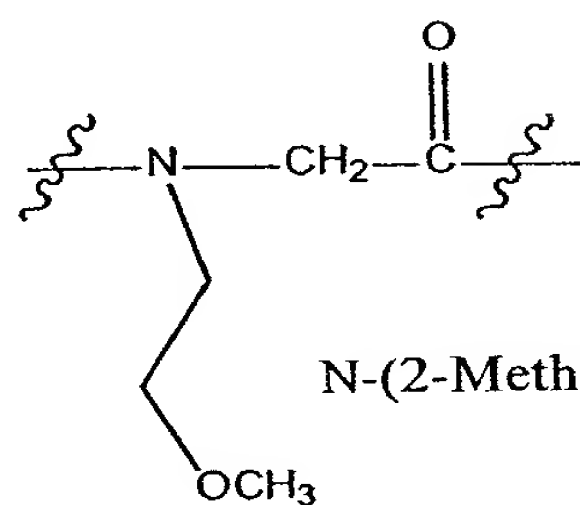
Peptide



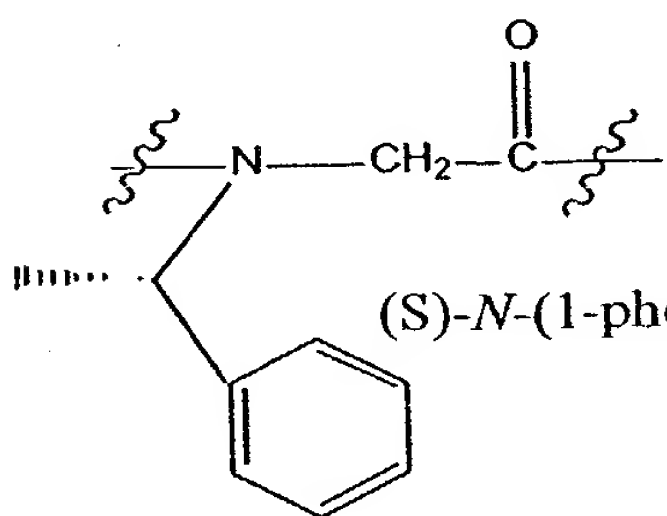
Peptoid



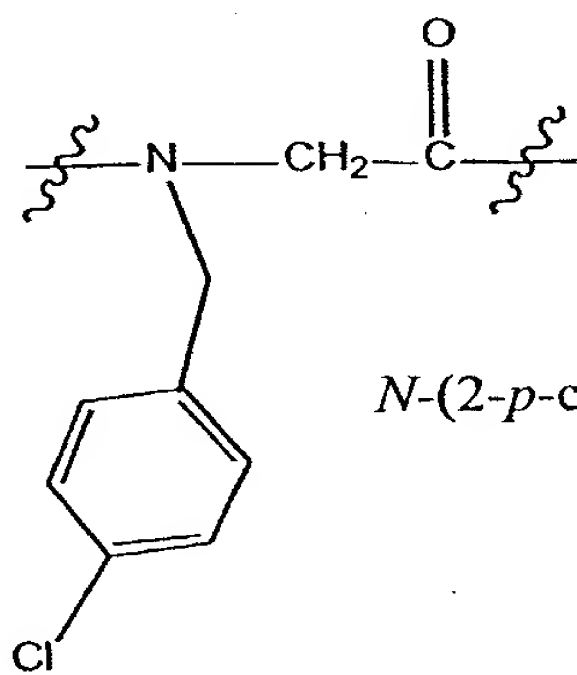
*N*-benzyl



*N*-(2-Methoxyethyl)



(*S*)-*N*-(1-phenylethyl)



*N*-(2-*p*-chlorophenylethyl)

FIGURE 4

09919687-072701

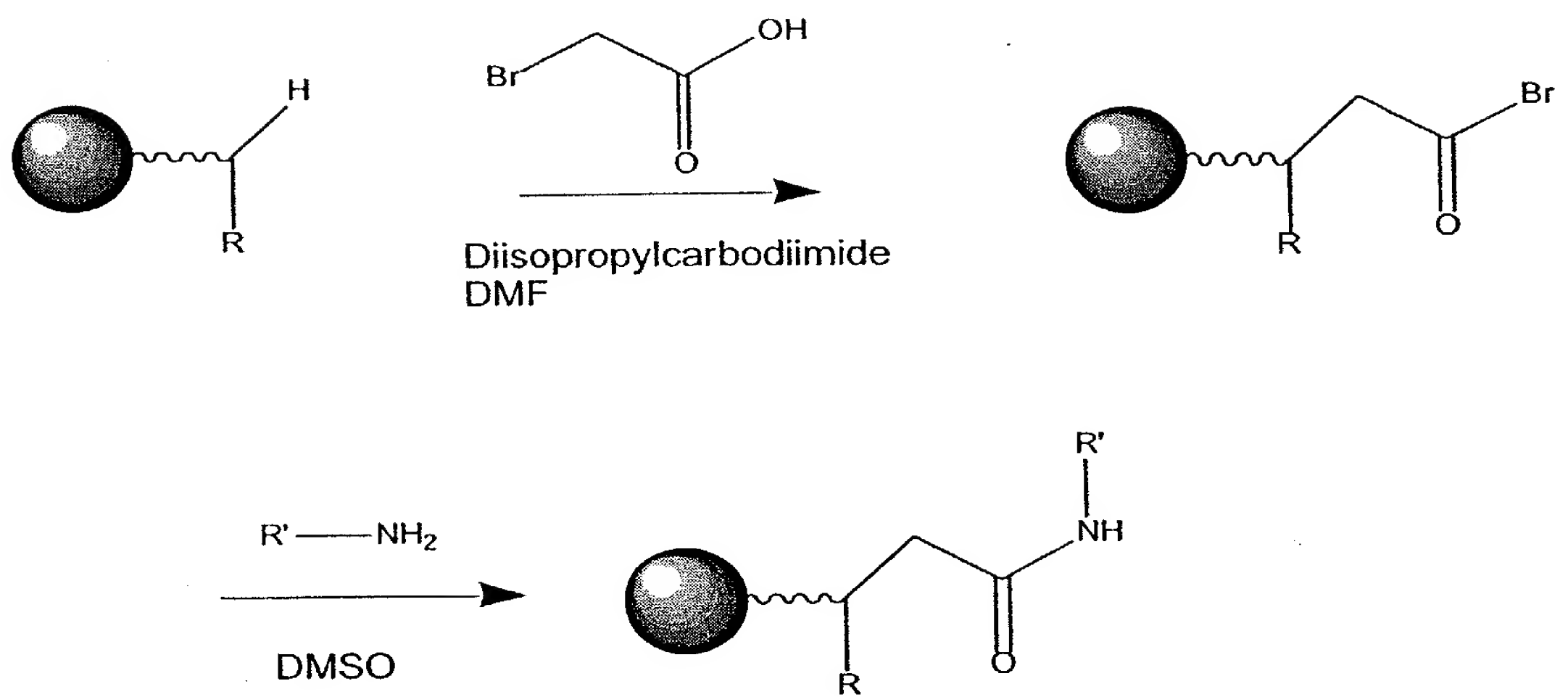
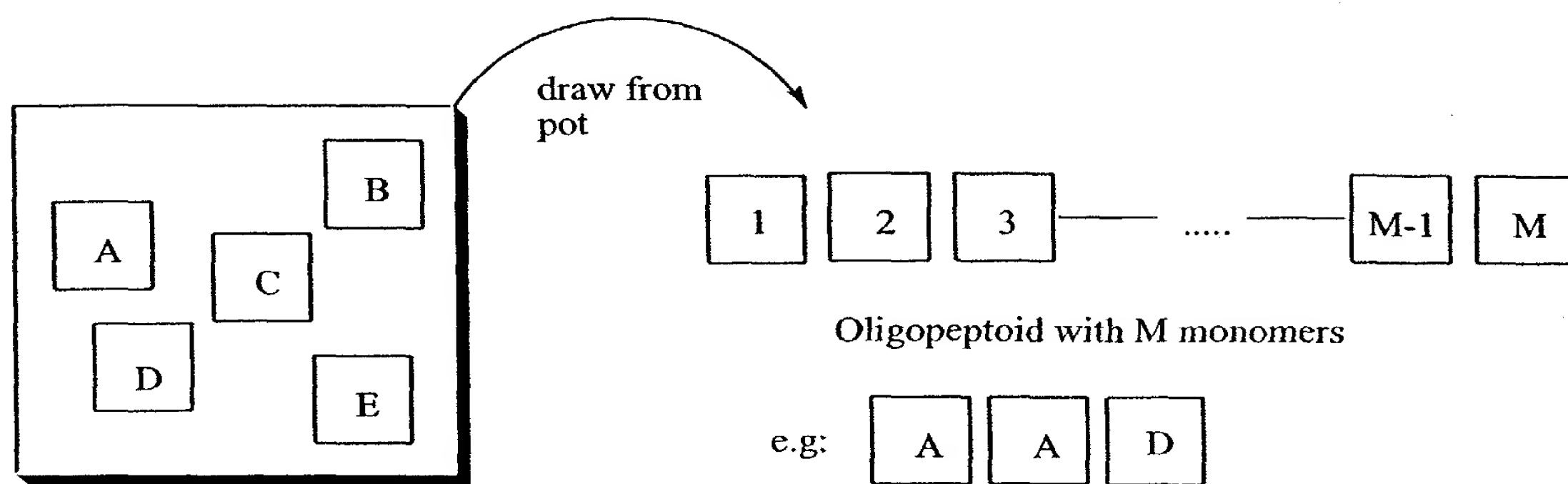


FIGURE 5

09916687.072701

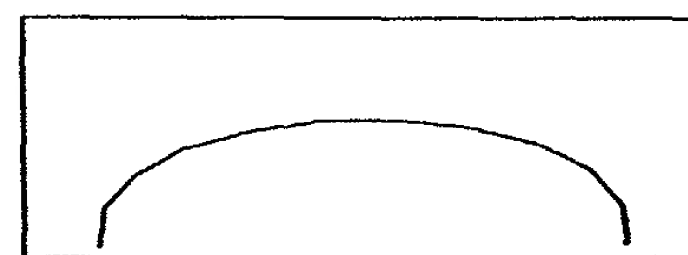


N monomers of unique mass

L = # of different peptoids with a unique combination of monomers

$$L = \binom{M+N-1}{N}$$

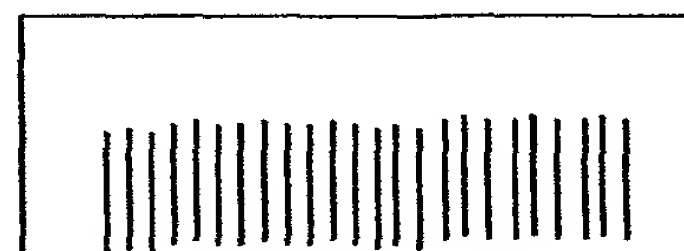
Example: 10 monomers, hexamer peptoids, yields 5005 combinations, or 8007 if pentamers and fewer are used too.



Mostly uniform distribution of molecular weights

Process library by removing coincidental combinations, when two unique combinations have the same mass

Also enforce other requirements, such as a minimum of X Daltons between species, or structural requirements such as at least two charged bases.



Desirable distribution of molecular weights

Assign oligo probes to tags and log, output library structure to peptoid synthesizer

FIGURE 6

Figure 7

| N  | 1  | 2   | 3     | 4      | 5       | 6       | 7        | 8        | 9        | 10       | 11       | 12       | 13       | 14       | 15       | 16       | 17      | 18      | 19      | 20      | 21      | 22      | 23      | 24      | 25      |
|----|----|-----|-------|--------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1  | 1  | 1   | 1     | 1      | 1       | 1       | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1       | 1       | 1       | 1       | 1       | 1       | 1       | 1       | 1       |
| 2  | 2  | 3   | 4     | 5      | 6       | 7       | 8        | 9        | 10       | 11       | 12       | 13       | 14       | 15       | 16       | 17       | 18      | 19      | 20      | 21      | 22      | 23      | 24      | 25      | 26      |
| 3  | 3  | 6   | 10    | 15     | 21      | 28      | 36       | 45       | 55       | 66       | 78       | 91       | 105      | 120      | 136      | 153      | 171     | 190     | 210     | 231     | 253     | 276     | 300     | 325     | 351     |
| 4  | 4  | 10  | 20    | 35     | 56      | 84      | 120      | 165      | 220      | 286      | 364      | 455      | 560      | 680      | 816      | 969      | 1140    | 1330    | 1540    | 1771    | 2024    | 2300    | 2600    | 2925    | 3276    |
| 5  | 5  | 15  | 35    | 70     | 126     | 210     | 330      | 495      | 715      | 1001     | 1365     | 1820     | 2380     | 3060     | 3876     | 4845     | 5985    | 7315    | 8855    | 10626   | 12650   | 14950   | 17550   | 20475   | 23751   |
| 6  | 6  | 21  | 56    | 126    | 252     | 462     | 792      | 1287     | 2002     | 3003     | 4368     | 6188     | 8568     | 11628    | 15504    | 20349    | 26334   | 33649   | 42504   | 53130   | 65780   | 80730   | 98280   | 118755  | 142506  |
| 7  | 7  | 28  | 84    | 210    | 462     | 924     | 1716     | 3432     | 6435     | 11440    | 19448    | 31824    | 50388    | 77520    | 116280   | 170544   | 245157  | 346104  | 480700  | 657800  | 888030  | 1184040 | 1560780 | 2035800 | 2629575 |
| 8  | 8  | 36  | 120   | 330    | 792     | 1716    | 3432     | 6435     | 11440    | 19448    | 31824    | 50388    | 77520    | 116280   | 170544   | 245157   | 346104  | 480700  | 657800  | 888030  | 1184040 | 1560780 | 2035800 | 2629575 | 3365856 |
| 9  | 9  | 45  | 165   | 495    | 1287    | 3003    | 6435     | 12870    | 24310    | 48620    | 92378    | 167960   | 293930   | 497420   | 817190   | 1307504  | 2042975 | 3124550 | 4686825 | 6908900 | 1E+07   | 2E+07   | 2.8E+07 | 3.9E+07 | 5.2E+07 |
| 10 | 10 | 55  | 220   | 715    | 2002    | 5005    | 11440    | 24310    | 48620    | 92378    | 167960   | 293930   | 497420   | 817190   | 1307504  | 2042975  | 3124550 | 4686825 | 6908900 | 1E+07   | 2E+07   | 2.8E+07 | 3.9E+07 | 5.2E+07 | 7.3E+07 |
| 11 | 11 | 66  | 286   | 1001   | 3003    | 8008    | 19448    | 43758    | 92378    | 184756   | 352716   | 646646   | 1144066  | 1961256  | 3268760  | 5311735  | 8436285 | 1.3E+07 | 2.1E+07 | 3.5E+07 | 5.5E+07 | 8.5E+07 | 1.3E+08 | 1.8E+08 | 2.5E+08 |
| 12 | 12 | 78  | 364   | 1365   | 4368    | 12376   | 31824    | 75562    | 167960   | 352716   | 705432   | 1352078  | 2496144  | 4457400  | 7726160  | 1.3E+07  | 2.1E+07 | 3.5E+07 | 5.5E+07 | 8.5E+07 | 1.3E+08 | 1.9E+08 | 2.9E+08 | 4.2E+08 | 6E+08   |
| 13 | 13 | 91  | 465   | 1820   | 6188    | 18564   | 50388    | 125970   | 293930   | 646646   | 1352078  | 2704156  | 5200300  | 9657700  | 17383860 | 3E+07    | 5.2E+07 | 8.5E+07 | 1.4E+08 | 2.3E+08 | 3.5E+08 | 5.5E+08 | 8.3E+08 | 1.3E+09 | 1.9E+09 |
| 14 | 14 | 105 | 560   | 2380   | 8568    | 27132   | 77520    | 203490   | 497420   | 1144066  | 2496144  | 5200300  | 10400800 | 20058300 | 37442160 | 6.8E+07  | 1.2E+08 | 2.1E+08 | 3.5E+08 | 5.7E+08 | 9.3E+08 | 1.5E+09 | 2.3E+09 | 3.6E+09 | 5.4E+09 |
| 15 | 15 | 120 | 680   | 3060   | 11628   | 38760   | 116280   | 319770   | 817190   | 1961256  | 4457400  | 9657700  | 20058300 | 40116600 | 77558760 | 1.5E+08  | 2.7E+08 | 4.7E+08 | 8.2E+08 | 1.4E+09 | 2.3E+09 | 3.8E+09 | 6.1E+09 | 9.7E+09 | 1.5E+10 |
| 16 | 16 | 136 | 816   | 3876   | 15504   | 54264   | 170544   | 490314   | 1307504  | 3268760  | 7726160  | 17383860 | 37442160 | 77558760 | 1.55E+08 | 3E+08    | 5.7E+08 | 1E+09   | 1.9E+09 | 3.2E+09 | 5.6E+09 | 9.4E+09 | 1.5E+10 | 2.5E+10 | 4E+10   |
| 17 | 17 | 153 | 969   | 4845   | 20349   | 74613   | 245157   | 735471   | 2042975  | 5311735  | 13037895 | 30421755 | 67863915 | 1.45E+08 | 3.01E+08 | 6E+08    | 1.2E+09 | 2.2E+09 | 4.1E+09 | 7.3E+09 | 1.3E+10 | 2.2E+10 | 3.8E+10 | 6.3E+10 | 1E+11   |
| 18 | 18 | 171 | 1140  | 5985   | 26334   | 100947  | 346104   | 1081575  | 3124550  | 8436285  | 21474180 | 51895935 | 1.2E+08  | 2.65E+08 | 5.66E+08 | 1.2E+09  | 2.3E+09 | 4.5E+09 | 8.6E+09 | 1.6E+10 | 2.9E+10 | 5.1E+10 | 8.9E+10 | 1.5E+11 | 2.5E+11 |
| 19 | 19 | 190 | 1330  | 8855   | 33649   | 134596  | 480700   | 1562275  | 4292145  | 1081575  | 27220075 | 67863915 | 1.45E+08 | 3.01E+08 | 6E+08    | 1.2E+09  | 2.2E+09 | 4.1E+09 | 7.3E+09 | 1.3E+10 | 2.2E+10 | 3.8E+10 | 6.3E+10 | 1E+11   | 2.5E+11 |
| 20 | 20 | 210 | 1540  | 8855   | 33649   | 134596  | 480700   | 1562275  | 4292145  | 1081575  | 27220075 | 67863915 | 1.45E+08 | 3.01E+08 | 6E+08    | 1.2E+09  | 2.2E+09 | 4.1E+09 | 7.3E+09 | 1.3E+10 | 2.2E+10 | 3.8E+10 | 6.3E+10 | 1E+11   | 2.5E+11 |
| 21 | 21 | 231 | 1771  | 10626  | 53130   | 203230  | 53130    | 10626    | 53130    | 203230   | 53130    | 10626    | 53130    | 203230   | 53130    | 10626    | 53130   | 203230  | 53130   | 10626   | 53130   | 203230  | 53130   | 10626   | 53130   |
| 22 | 22 | 253 | 2024  | 12650  | 65780   | 26334   | 100947   | 346104   | 1081575  | 3124550  | 8436285  | 21474180 | 51895935 | 1.2E+08  | 2.65E+08 | 5.66E+08 | 1.2E+09 | 2.3E+09 | 4.5E+09 | 8.6E+09 | 1.6E+10 | 2.9E+10 | 5.1E+10 | 8.9E+10 | 1.5E+11 |
| 23 | 23 | 276 | 2300  | 14950  | 80730   | 376740  | 116280   | 319770   | 817190   | 1961256  | 4457400  | 9657700  | 20058300 | 40116600 | 77558760 | 1.5E+08  | 2.7E+08 | 4.7E+08 | 8.2E+08 | 1.4E+09 | 2.3E+09 | 3.8E+09 | 6.1E+09 | 9.7E+09 | 1.5E+10 |
| 24 | 24 | 300 | 2600  | 17550  | 98280   | 475020  | 2035800  | 7888725  | 2048800  | 92561040 | 2.86E+08 | 8.34E+08 | 2.31E+09 | 6.11E+09 | 1.55E+10 | 3.8E+10  | 8.9E+10 | 2E+11   | 4.5E+11 | 9.6E+11 | 2E+12   | 4.1E+12 | 8.2E+12 | 1.6E+13 | 3.1E+13 |
| 25 | 25 | 325 | 2925  | 20475  | 118755  | 593775  | 2629575  | 10518300 | 39567100 | 1.31E+08 | 4.17E+08 | 1.25E+09 | 3.56E+09 | 9.67E+09 | 2.51E+10 | 6.3E+10  | 1.5E+11 | 3.5E+11 | 8E+11   | 1.8E+12 | 3.2E+12 | 5.6E+12 | 9.8E+12 | 1.5E+13 | 3.1E+13 |
| 26 | 26 | 351 | 3276  | 23751  | 142506  | 736281  | 3365856  | 13884156 | 52451256 | 1.84E+08 | 6.01E+08 | 1.85E+09 | 5.41E+09 | 1.51E+10 | 4.02E+10 | 1E+11    | 2.5E+11 | 6.1E+11 | 1.4E+12 | 3.2E+12 | 5.6E+12 | 9.8E+12 | 1.5E+13 | 3.1E+13 | 6.3E+13 |
| 27 | 27 | 378 | 3654  | 27405  | 169911  | 906192  | 4272048  | 18156204 | 70607460 | 2.54E+08 | 8.55E+08 | 2.71E+09 | 8.12E+09 | 2.32E+10 | 6.34E+10 | 1.7E+11  | 4.2E+11 | 9.9E+11 | 2.2E+12 | 4.9E+12 | 1.1E+13 | 2.7E+13 | 5.8E+13 | 1.2E+14 | 2.5E+14 |
| 28 | 28 | 406 | 4060  | 31465  | 201376  | 1107568 | 5379616  | 23535820 | 94143280 | 3.48E+08 | 1.2E+09  | 3.91E+09 | 1.2E+10  | 3.52E+10 | 9.87E+10 | 2.7E+11  | 6.9E+11 | 1.7E+12 | 4.2E+12 | 9.8E+12 | 2.2E+13 | 5E+13   | 1.1E+14 | 2.3E+14 | 4.8E+14 |
| 29 | 29 | 435 | 4495  | 35960  | 237336  | 1344904 | 6724520  | 30260340 | 1.24E+08 | 4.73E+08 | 1.68E+09 | 5.59E+09 | 1.76E+10 | 5.29E+10 | 1.52E+11 | 4.2E+11  | 1.1E+12 | 2.8E+12 | 7E+12   | 1.7E+13 | 3.9E+13 | 8.9E+13 | 2E+14   | 4.3E+14 | 9E+14   |
| 30 | 30 | 465 | 4960  | 40920  | 278256  | 1623160 | 8347680  | 38608020 | 1.63E+08 | 6.36E+08 | 2.31E+09 | 7.9E+09  | 2.55E+10 | 7.84E+10 | 2.3E+11  | 6.5E+11  | 1.7E+12 | 4.6E+12 | 1.2E+13 | 2.8E+13 | 6.7E+13 | 1.6E+14 | 3.5E+14 | 7.8E+14 | 1.7E+15 |
| 31 | 31 | 496 | 5456  | 46376  | 324632  | 1947792 | 10295472 | 48903492 | 2.12E+08 | 8.48E+08 | 3.16E+09 | 1.11E+10 | 3.66E+10 | 1.15E+11 | 3.48E+11 | 9.9E+11  | 2.7E+12 | 7.3E+12 | 1.9E+13 | 4.7E+13 | 1.1E+14 | 2.7E+14 | 6.2E+14 | 1.4E+15 | 3.1E+15 |
| 32 | 32 | 528 | 5984  | 52360  | 376992  | 2324784 | 12620256 | 61523748 | 2.73E+08 | 1.12E+09 | 4.28E+09 | 1.53E+10 | 5.19E+10 | 1.67E+11 | 5.12E+11 | 1.5E+12  | 4.2E+12 | 1.2E+13 | 3E+13   | 7.8E+13 | 1.9E+14 | 4.6E+14 | 1.1E+15 | 2.5E+15 | 5.6E+15 |
| 33 | 33 | 561 | 6545  | 59905  | 435897  | 2760681 | 15380937 | 76904685 | 3.5E+08  | 1.47E+09 | 5.75E+09 | 2.11E+10 | 7.3E+10  | 2.4E+11  | 7.52E+11 | 2.3E+12  | 6.5E+12 | 1.8E+13 | 4.8E+13 | 1.3E+14 | 3.2E+14 | 7.8E+14 | 1.9E+15 | 4.4E+15 | 9.9E+15 |
| 34 | 34 | 595 | 7140  | 65045  | 501942  | 3262623 | 18643560 | 95548245 | 4.48E+08 | 1.92E+09 | 7.67E+09 | 2.88E+10 | 1.02E+11 | 3.42E+11 | 1.09E+12 | 3.3E+12  | 9.8E+12 | 2.8E+13 | 7.6E+13 | 2E+14   | 5.2E+14 | 1.3E+15 | 3.2E+15 | 7.5E+15 | 1.7E+16 |
| 35 | 35 | 630 | 7770  | 73815  | 575757  | 3838380 | 22481940 | 1.19E+08 | 5.64E+08 | 2.48E+09 | 1.02E+10 | 3.89E+10 | 1.41E+11 | 4.82E+11 | 1.58E+12 | 4.9E+12  | 1.5E+13 | 4.3E+13 | 1.2E+14 | 3.2E+14 | 8.4E+14 | 2.1E+15 | 5.3E+15 | 1.3E+16 | 3E+16   |
| 36 | 36 | 666 | 8436  | 82251  | 658008  | 4496388 | 26978328 | 1.45E+08 | 7.09E+08 | 3.19E+09 | 1.33E+10 | 5.23E+10 | 1.93E+11 | 6.75E+11 | 2.25E+12 | 7.2E+12  | 2.2E+13 | 6.5E+13 | 1.8E+14 | 5.1E+14 | 1.3E+15 | 3.5E+15 | 8.8E+15 | 2.2E+16 | 5.2E+16 |
| 37 | 37 | 703 | 9139  | 91390  | 749398  | 5245786 | 32224114 | 1.77E+08 | 8.86E+08 | 4.08E+09 | 1.74E+10 | 6.97E+10 | 2.63E+11 | 9.38E+11 | 3.19E+12 | 1E+13    | 3.2E+13 | 9.7E+13 | 2.8E+14 | 7.9E+14 | 2.1E+15 | 5.6E+15 | 1.4E+16 | 3.6E+16 | 8.8E+16 |
| 38 | 38 | 741 | 9880  | 101270 | 850668  | 6096454 | 38320568 | 2.16E+08 | 1.1E+09  | 5.18E+09 | 2.26E+10 | 9.23E+10 | 3.55E+11 | 1.29E+12 | 4.48E+12 | 1.5E+13  | 4.7E+13 | 1.4E+14 | 4.2E+14 | 1.2E+15 | 3.3E+15 | 9E+15   | 2.3E+16 | 5.9E+16 | 1.5E+17 |
| 39 | 39 | 780 | 10660 | 111930 | 962598  | 7059052 | 45379620 | 2.61E+08 | 1.36E+09 | 6.54E+09 | 2.91E+10 | 1.21E+11 | 4.76E+11 | 1.77E+12 | 6.25E+12 | 2.1E+13  | 6.8E+13 | 2.1E+14 | 6.4E+14 | 1.8E+15 | 5.2E+15 | 1.4E+16 | 3.8E+16 | 9.7E+16 | 2.4E+17 |
| 40 | 40 | 820 | 11480 | 123410 | 1086008 | 8145060 | 53524680 | 3.14E+08 | 1.68E+09 | 8.22E+09 | 3.74E+10 | 1.59E+11 | 6.35E+11 | 2.4E+12  | 8.65E+12 | 3E+13    | 9.8E+13 | 3.1E+14 | 9.5E+14 | 2.8E+15 | 8E+15   | 2.2E+16 | 6E+16   | 1.6E+17 | 4E+17   |

M=length of polypeptide  
N=# of monomers of unique mass

TDZ20° 2838T660

Figure 8A

| M  |     | N     |        |         |         |          |           |            |             |             |             |  |  |
|----|-----|-------|--------|---------|---------|----------|-----------|------------|-------------|-------------|-------------|--|--|
| 1  | 2   | 3     | 4      | 5       | 6       | 7        | 8         | 9          | 10          | 11          | 12          |  |  |
| 1  | 1   | 3     | 4      | 5       | 6       | 7        | 8         | 9          | 10          | 11          | 12          |  |  |
| 2  | 2   | 3     | 4      | 5       | 1       | 6        | 7         | 8          | 9           | 1           | 10          |  |  |
| 3  | 5   | 9     | 14     | 20      | 27      | 35       | 44        | 54         | 65          | 77          | 90          |  |  |
| 4  | 9   | 19    | 34     | 55      | 83      | 119      | 164       | 219        | 285         | 363         | 454         |  |  |
| 5  | 14  | 34    | 69     | 125     | 209     | 329      | 494       | 714        | 1000        | 1364        | 1819        |  |  |
| 6  | 20  | 55    | 125    | 251     | 461     | 791      | 1286      | 2001       | 3002        | 4367        | 6187        |  |  |
| 7  | 27  | 83    | 209    | 461     | 923     | 1715     | 3002      | 5004       | 8007        | 12375       | 18563       |  |  |
| 8  | 35  | 119   | 329    | 791     | 1715    | 3431     | 6434      | 11439      | 19447       | 31823       | 50387       |  |  |
| 9  | 44  | 164   | 494    | 1286    | 3002    | 6434     | 12869     | 24309      | 43757       | 75581       | 125969      |  |  |
| 10 | 54  | 219   | 714    | 2001    | 5004    | 11439    | 24309     | 48619      | 92377       | 167959      | 293929      |  |  |
| 11 | 65  | 285   | 1000   | 3002    | 8007    | 19447    | 48619     | 92377      | 184755      | 352715      | 646645      |  |  |
| 12 | 77  | 363   | 1364   | 4367    | 12375   | 31823    | 75581     | 167959     | 352715      | 705431      | 1352077     |  |  |
| 13 | 90  | 454   | 1819   | 6187    | 18563   | 50387    | 125969    | 293929     | 646645      | 1352077     | 2704155     |  |  |
| 14 | 104 | 559   | 2379   | 8567    | 27131   | 77519    | 203489    | 497419     | 1144065     | 2496143     | 5200299     |  |  |
| 15 | 119 | 679   | 3059   | 11627   | 38759   | 116279   | 319769    | 817189     | 1961255     | 4457399     | 9657699     |  |  |
| 16 | 135 | 815   | 3875   | 15503   | 54263   | 170543   | 490313    | 1307503    | 3268759     | 7726159     | 17383859    |  |  |
| 17 | 152 | 968   | 4844   | 20348   | 74612   | 245156   | 735470    | 2042974    | 5311734     | 13037894    | 30421754    |  |  |
| 18 | 170 | 1139  | 5984   | 26333   | 100946  | 346103   | 1081574   | 3124549    | 8436284     | 21474179    | 51895934    |  |  |
| 19 | 189 | 1329  | 7314   | 33648   | 134595  | 480699   | 1562274   | 4686824    | 13123109    | 34597289    | 86493224    |  |  |
| 20 | 209 | 1539  | 8854   | 42503   | 177099  | 657799   | 2220074   | 6906899    | 20030009    | 54627299    | 141120524   |  |  |
| 21 | 230 | 1770  | 10625  | 53129   | 230229  | 888029   | 3108104   | 10015004   | 30045014    | 84672314    | 225792839   |  |  |
| 22 | 252 | 2023  | 12649  | 65779   | 296009  | 1184039  | 4292144   | 14307149   | 44352164    | 129024479   | 354817319   |  |  |
| 23 | 275 | 2299  | 14949  | 80729   | 376739  | 1560779  | 5852924   | 20160074   | 64512239    | 193536719   | 548354039   |  |  |
| 24 | 299 | 2599  | 17549  | 98279   | 475019  | 2035799  | 7888724   | 28048799   | 92561039    | 286097759   | 834451799   |  |  |
| 25 | 324 | 2924  | 20474  | 118754  | 593774  | 2629574  | 10518299  | 38567099   | 131128139   | 417225899   | 1251677699  |  |  |
| 26 | 350 | 3275  | 23750  | 142505  | 736280  | 3365855  | 13884155  | 52451255   | 183579395   | 600805295   | 1852482995  |  |  |
| 27 | 377 | 3653  | 27404  | 169910  | 906191  | 4272047  | 18156203  | 70607459   | 254186855   | 854992151   | 2707475147  |  |  |
| 28 | 405 | 4059  | 31464  | 201375  | 1107567 | 5379615  | 23535819  | 94143279   | 348330135   | 1203322287  | 3910797435  |  |  |
| 29 | 434 | 4494  | 35959  | 237335  | 1344903 | 6724519  | 30260339  | 124403619  | 472733755   | 1676056043  | 5586853479  |  |  |
| 30 | 464 | 4959  | 40919  | 278255  | 1623159 | 8347679  | 38608019  | 163011639  | 635745395   | 2311801439  | 7898654919  |  |  |
| 31 | 495 | 5455  | 46375  | 324631  | 1947791 | 10295471 | 48903491  | 211915131  | 847660527   | 3159461967  | 11058116887 |  |  |
| 32 | 527 | 5983  | 52359  | 376991  | 2324783 | 12620255 | 61523747  | 273438879  | 1121099407  | 4280561375  | 15338678263 |  |  |
| 33 | 560 | 6544  | 58904  | 435896  | 2760680 | 15380936 | 76904684  | 350343564  | 1471442972  | 5752004348  | 21090682612 |  |  |
| 34 | 594 | 7139  | 66044  | 501941  | 3262622 | 18643559 | 95548244  | 445891809  | 1917334782  | 7669339131  | 28760021744 |  |  |
| 35 | 629 | 7769  | 73814  | 575756  | 3838379 | 22481939 | 118030184 | 563921994  | 2481256777  | 10150595909 | 38910617654 |  |  |
| 36 | 665 | 8435  | 82250  | 658007  | 4496387 | 26978327 | 145008512 | 708930507  | 3190187285  | 13340783195 | 52251400850 |  |  |
| 37 | 702 | 9138  | 91389  | 749397  | 5245785 | 32224113 | 177232626 | 886163134  | 4076350420  | 17417133616 | 69668534467 |  |  |
| 38 | 740 | 9879  | 101269 | 850667  | 6096453 | 38320567 | 215553194 | 1101716329 | 5178066750  | 22595200367 | 92263734835 |  |  |
| 39 | 779 | 10659 | 111929 | 962597  | 7059051 | 45379619 | 260932814 | 1362649144 | 6540715895  | 29135916263 | 1.21E+11    |  |  |
| 40 | 819 | 11479 | 123409 | 1086007 | 8145059 | 53524679 | 314457494 | 1677106639 | 8217822535  | 37353738799 | 1.59E+11    |  |  |
|    | 860 | 12340 | 135750 | 1221758 | 9366818 | 62891498 | 377348993 | 2054455633 | 10272278169 | 47626016969 | 2.06E+11    |  |  |



Figure 8B

| N  | M  | 13          | 14          | 15          | 16          | 17          | 18          | 19          | 20          | 21          | 22          | 23          | 24          | 25          |
|----|----|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1  | 1  | 11          | 12          | 13          | 1           | 14          | 15          | 16          | 17          | 1           | 18          | 19          | 20          | 21          |
| 2  | 1  | 104         | 119         | 135         | 152         | 170         | 189         | 209         | 230         | 252         | 275         | 299         | 324         | 350         |
| 3  | 2  | 559         | 679         | 815         | 968         | 1139        | 1329        | 1539        | 1770        | 2023        | 2299        | 2599        | 2924        | 3275        |
| 4  | 3  | 2379        | 3059        | 3875        | 4844        | 5984        | 7314        | 8854        | 10625       | 12649       | 14949       | 17549       | 20474       | 23750       |
| 5  | 4  | 8567        | 11627       | 15503       | 20348       | 26333       | 33648       | 42503       | 53129       | 65779       | 80729       | 98279       | 118754      | 142505      |
| 6  | 5  | 27131       | 38759       | 54263       | 74812       | 100946      | 134595      | 177099      | 230229      | 296009      | 376739      | 475019      | 593774      | 736280      |
| 7  | 6  | 77519       | 116279      | 170543      | 245156      | 346103      | 480899      | 657799      | 888029      | 1184039     | 1550779     | 2035799     | 2629574     | 3365855     |
| 8  | 7  | 203489      | 319769      | 490313      | 735470      | 1081574     | 1562274     | 2220074     | 3108104     | 4292144     | 5852924     | 7888724     | 10518299    | 13884155    |
| 9  | 8  | 497419      | 817189      | 1307503     | 2042974     | 3124549     | 4686824     | 6906899     | 10015004    | 14307149    | 20160074    | 28048799    | 38567099    | 52451255    |
| 10 | 9  | 1144065     | 1961255     | 3268759     | 5311734     | 8436284     | 13123109    | 20030009    | 30045014    | 44352164    | 64512239    | 92561039    | 131128139   | 183579395   |
| 11 | 10 | 2496143     | 4457399     | 7726159     | 13037894    | 21474179    | 34597289    | 54627299    | 84672314    | 129024479   | 193536719   | 286097759   | 417225899   | 600805295   |
| 12 | 11 | 5200299     | 9657699     | 17383859    | 30421754    | 51895934    | 86493224    | 141120524   | 225792839   | 354817319   | 548354039   | 834451799   | 1251677699  | 1852482995  |
| 13 | 12 | 10400599    | 20058299    | 37442159    | 67863914    | 119759949   | 206253074   | 347373599   | 573166439   | 927983759   | 1476337799  | 2310789599  | 3562467299  | 5414950295  |
| 14 | 13 | 20058299    | 40116599    | 77558759    | 145422674   | 265182524   | 471435599   | 818809199   | 1391975639  | 2319959399  | 3796297199  | 6107086799  | 9669554099  | 15084504395 |
| 15 | 14 | 37442159    | 77558759    | 155117519   | 300540194   | 565722719   | 1037158319  | 1855967519  | 3247943159  | 5567902559  | 9364199759  | 15471286559 | 25140840659 | 40225345055 |
| 16 | 15 | 67863914    | 145422674   | 300540194   | 601080389   | 1166803109  | 2203961429  | 4059928949  | 7307872109  | 12875774669 | 22239974429 | 37711260989 | 62852101649 | 103077E+11  |
| 17 | 16 | 119759849   | 265182524   | 565722719   | 1166803109  | 2333606219  | 4537567649  | 8597496599  | 1590368709  | 28781143379 | 51021117809 | 88732378799 | 151584E+11  | 254662E+11  |
| 18 | 17 | 206253074   | 471435599   | 1037158319  | 2203961429  | 4537567649  | 9075135299  | 17672631899 | 33578000609 | 62359143989 | 11338E+11   | 202113E+11  | 353697E+11  | 608359E+11  |
| 19 | 18 | 347373599   | 818809199   | 1855967519  | 4059928949  | 8597496599  | 17672631899 | 35345263799 | 68923264409 | 131282E+11  | 244663E+11  | 446775E+11  | 800472E+11  | 140883E+12  |
| 20 | 19 | 573166439   | 1391975639  | 3247943159  | 7307872109  | 1590368709  | 33578000609 | 68923264409 | 137847E+11  | 269129E+11  | 513792E+11  | 960667E+11  | 176104E+12  | 316987E+12  |
| 21 | 20 | 927983759   | 2319959399  | 5567902559  | 12875774669 | 28781143379 | 62359143989 | 131282E+11  | 269129E+11  | 538258E+11  | 105205E+12  | 201262E+12  | 377366E+12  | 694353E+12  |
| 22 | 21 | 1476337799  | 3796297199  | 9364199759  | 22239974429 | 51021117809 | 11338E+11   | 244663E+11  | 513792E+12  | 105205E+12  | 21041E+12   | 411672E+12  | 789037E+12  | 148339E+13  |
| 23 | 22 | 2310789599  | 6107086799  | 15471286559 | 37711260989 | 88732378799 | 202113E+11  | 446775E+11  | 960667E+11  | 201262E+12  | 411672E+12  | 823343E+12  | 161238E+13  | 309577E+13  |
| 24 | 23 | 3562467299  | 9669554099  | 25140840659 | 62852101649 | 151584E+11  | 353697E+11  | 800472E+11  | 176104E+12  | 377366E+12  | 789037E+12  | 161238E+13  | 322476E+13  | 632053E+13  |
| 25 | 24 | 5414950295  | 15084504395 | 40225345055 | 103077E+11  | 254662E+11  | 608359E+11  | 140883E+12  | 316987E+12  | 694353E+12  | 148339E+13  | 309577E+13  | 632053E+13  | 126411E+14  |
| 26 | 25 | 8122425443  | 23206929839 | 63432274895 | 16651E+11   | 421172E+11  | 102953E+12  | 243836E+12  | 560823E+12  | 125518E+13  | 273957E+13  | 583434E+13  | 121549E+14  | 247959E+14  |
| 27 | 26 | 1203322879  | 35240152719 | 98672427615 | 265182E+11  | 686354E+11  | 171588E+12  | 415425E+12  | 976248E+12  | 223142E+13  | 496999E+13  | 108043E+14  | 229592E+14  | 477551E+14  |
| 28 | 27 | 17620076359 | 52860229079 | 151533E+11  | 416715E+11  | 110307E+12  | 281895E+12  | 69732E+12   | 167357E+13  | 390499E+13  | 887498E+13  | 196793E+14  | 426385E+14  | 903936E+14  |
| 29 | 28 | 25518731279 | 78378960359 | 229912E+11  | 648626E+11  | 17497E+12   | 456865E+12  | 115418E+13  | 282775E+13  | 673274E+13  | 156077E+14  | 35287E+14   | 779255E+14  | 168319E+15  |
| 30 | 29 | 36576848167 | 114956E+11  | 344867E+11  | 991494E+11  | 274119E+12  | 730984E+12  | 188517E+13  | 471292E+13  | 114457E+14  | 270534E+14  | 623404E+14  | 140266E+15  | 308585E+15  |
| 31 | 30 | 51915526431 | 166871E+11  | 511739E+11  | 150323E+12  | 424442E+12  | 115543E+13  | 304059E+13  | 775552E+13  | 191992E+14  | 462526E+14  | 108593E+15  | 248859E+15  | 557444E+15  |
| 32 | 31 | 73006209044 | 239878E+11  | 751616E+11  | 225485E+12  | 649927E+12  | 180535E+13  | 484595E+13  | 125995E+14  | 317986E+14  | 780512E+14  | 186644E+15  | 435503E+15  | 992947E+15  |
| 33 | 32 | 101766E+11  | 341644E+11  | 109326E+12  | 334811E+12  | 984738E+12  | 279009E+13  | 763804E+13  | 202355E+14  | 520341E+14  | 130085E+15  | 31673E+15   | 752233E+15  | 174518E+16  |
| 34 | 33 | 140677E+11  | 482321E+11  | 157558E+12  | 492369E+12  | 147711E+13  | 42672E+13   | 119032E+14  | 321387E+14  | 841729E+14  | 214258E+15  | 530988E+15  | 128922E+16  | 30284E+16   |
| 35 | 34 | 192928E+11  | 675249E+11  | 225083E+12  | 717452E+12  | 219456E+13  | 646176E+13  | 18365E+14   | 505037E+14  | 134677E+15  | 348935E+15  | 879923E+15  | 216314E+16  | 519154E+16  |
| 36 | 35 | 262597E+11  | 937846E+11  | 318868E+12  | 103632E+13  | 323088E+13  | 969263E+13  | 280576E+14  | 785614E+14  | 213238E+15  | 562173E+15  | 14421E+16   | 360524E+16  | 879678E+16  |
| 37 | 36 | 354861E+11  | 129271E+12  | 448138E+12  | 148446E+13  | 471534E+13  | 14408E+14   | 424656E+14  | 121027E+15  | 334265E+15  | 896438E+15  | 233953E+16  | 594377E+16  | 147406E+17  |
| 38 | 37 | 47626E+11   | 176897E+12  | 625035E+12  | 210949E+13  | 682483E+13  | 212328E+14  | 636984E+14  | 184725E+15  | 51899E+15   | 141543E+16  | 375396E+16  | 969773E+16  | 244383E+17  |
| 39 | 38 | 635014E+11  | 240398E+12  | 865433E+12  | 297493E+13  | 979975E+13  | 310326E+14  | 947309E+14  | 279456E+15  | 798447E+15  | 221387E+16  | 596784E+16  | 156656E+17  | 401039E+17  |
| 40 | 39 | 841393E+11  | 324537E+12  | 118997E+13  | 41649E+13   | 139646E+14  | 449972E+14  | 139728E+15  | 419184E+15  | 121763E+16  | 343151E+16  | 939934E+16  | 250649E+17  | 651688E+17  |

0948687.073704

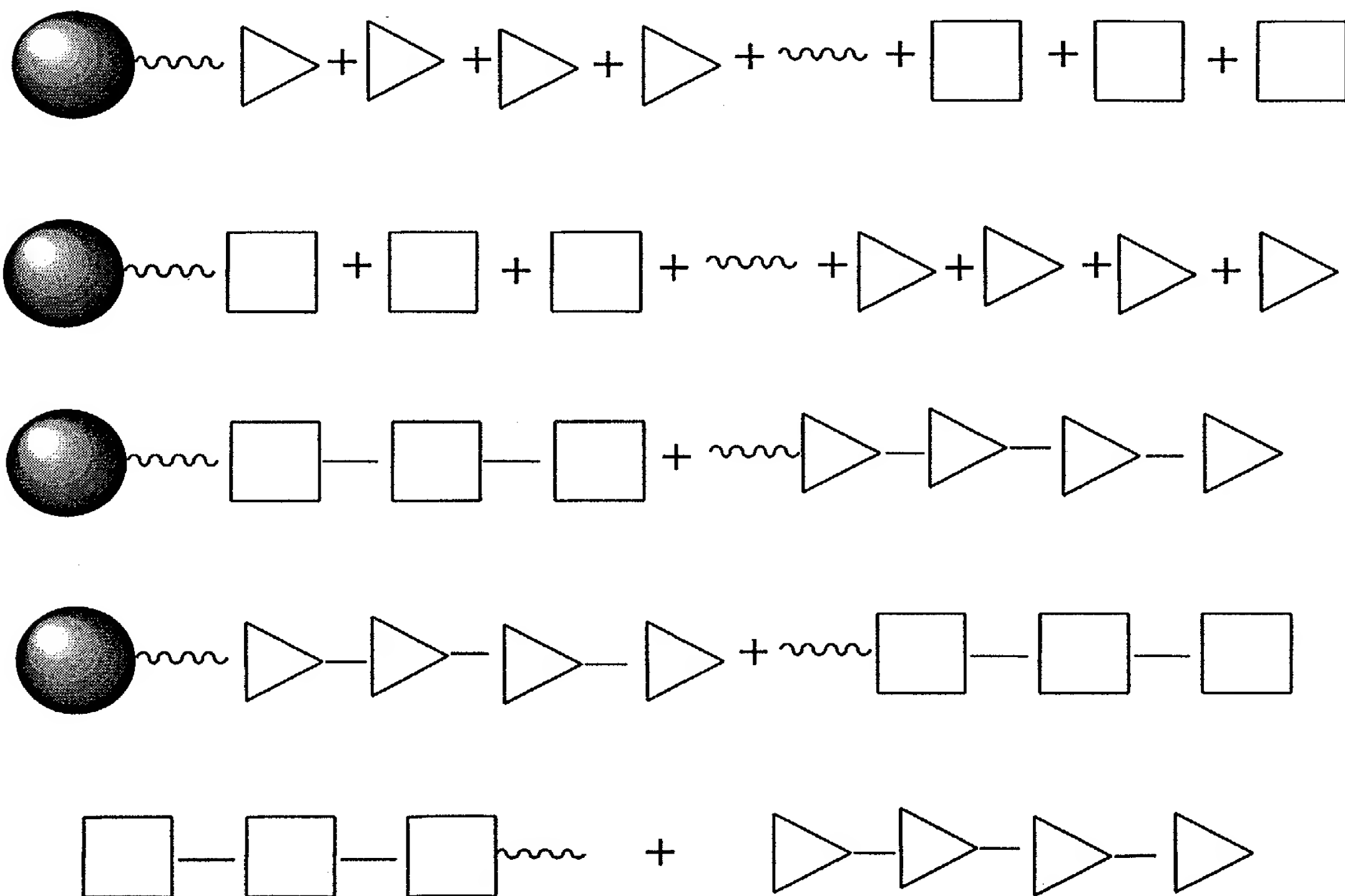
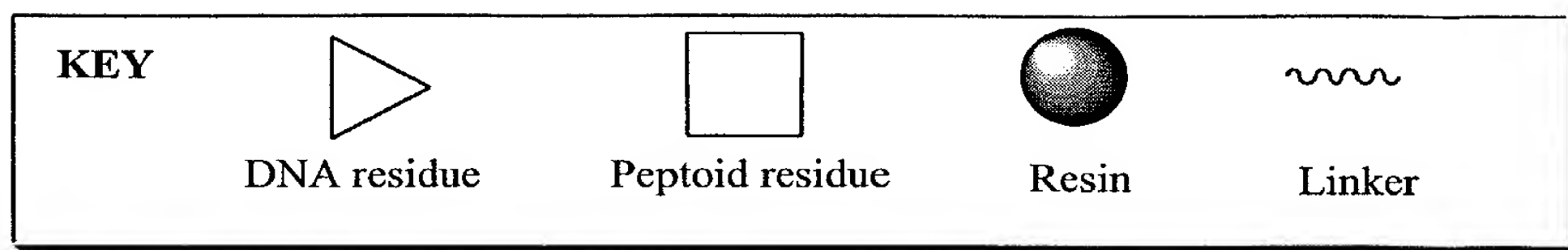
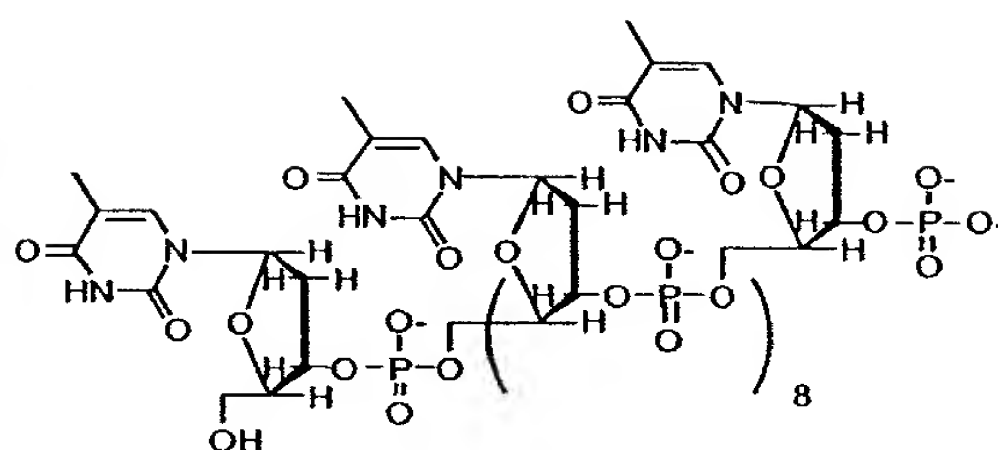
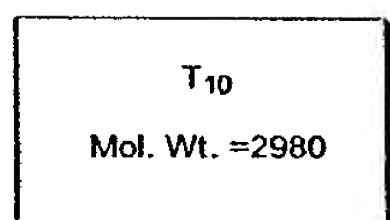


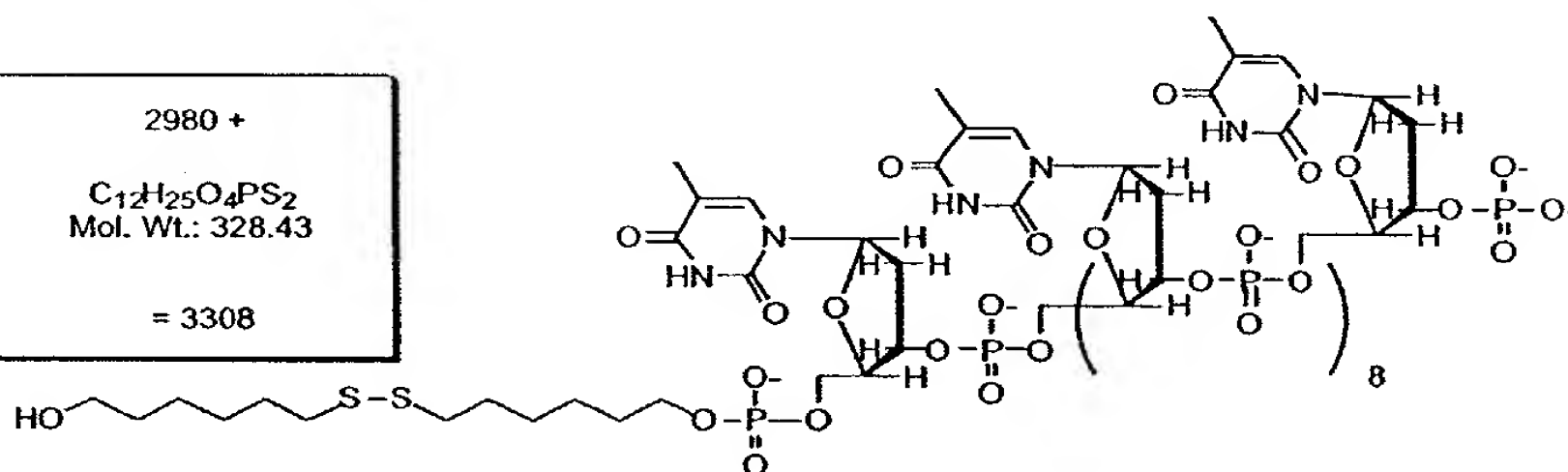
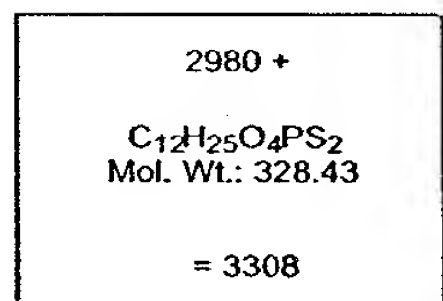
FIGURE 9

0901667.072704

N1



N2



N3

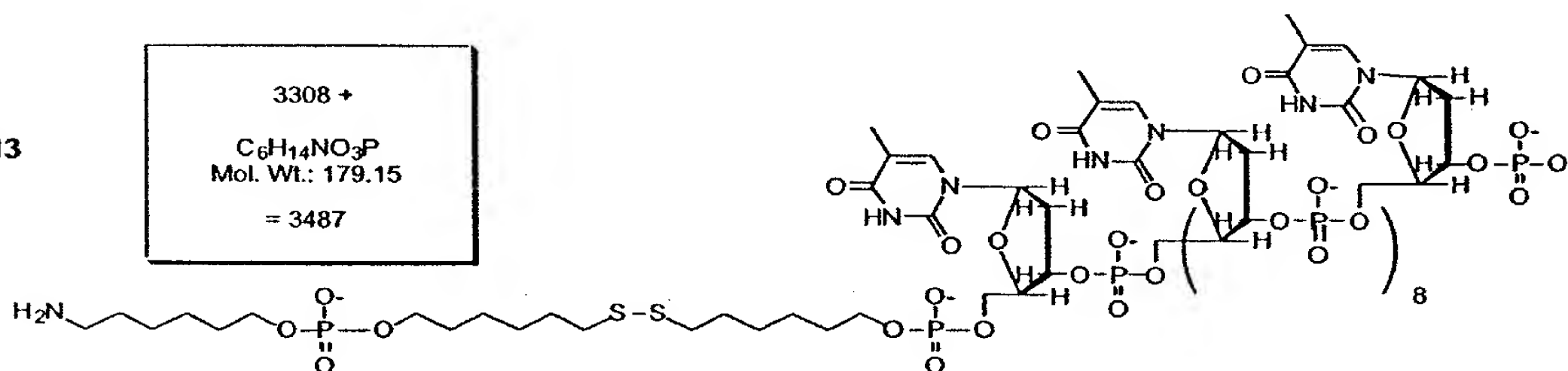
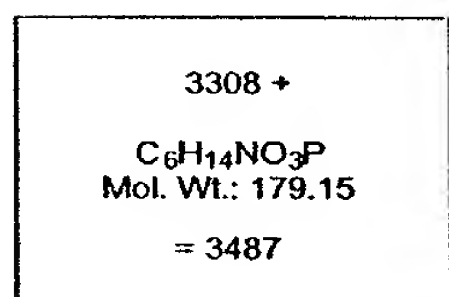


FIGURE 10

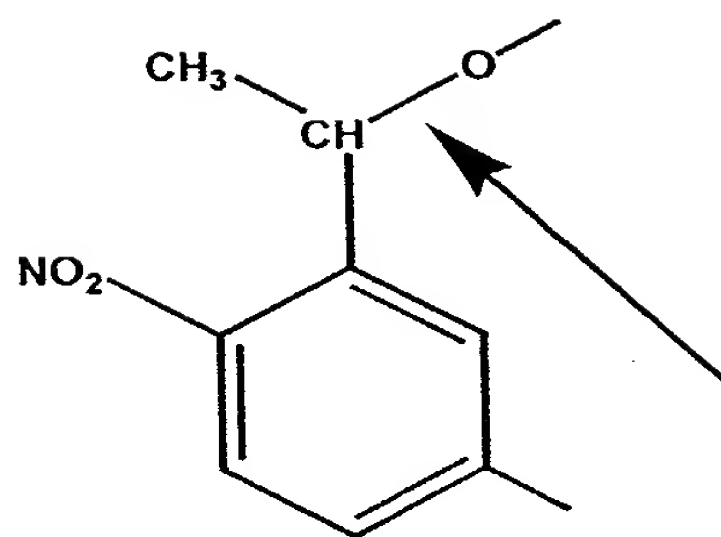


FIGURE 11A

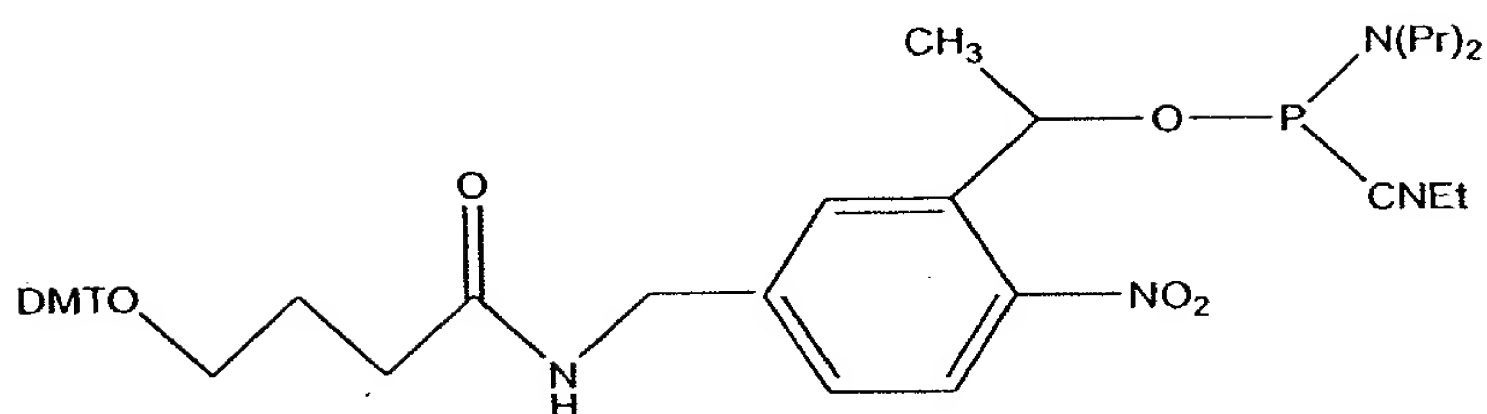


FIGURE 11B

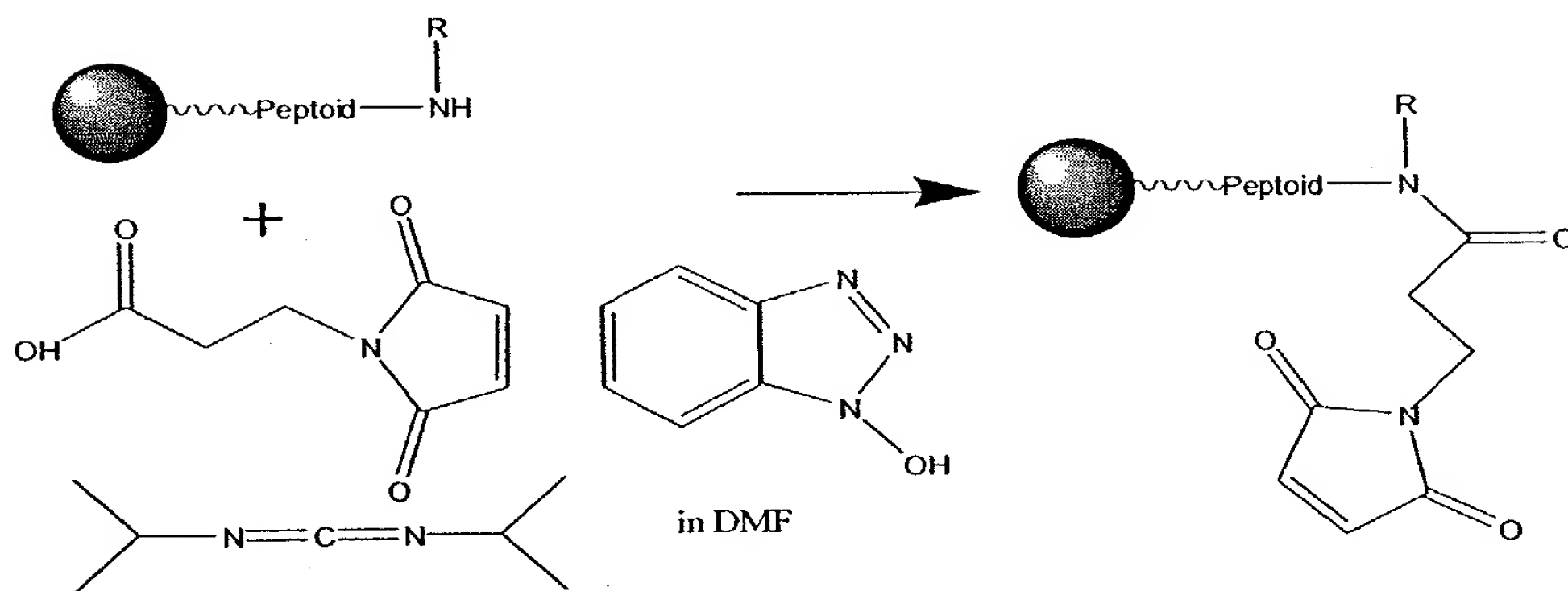


FIGURE 11C

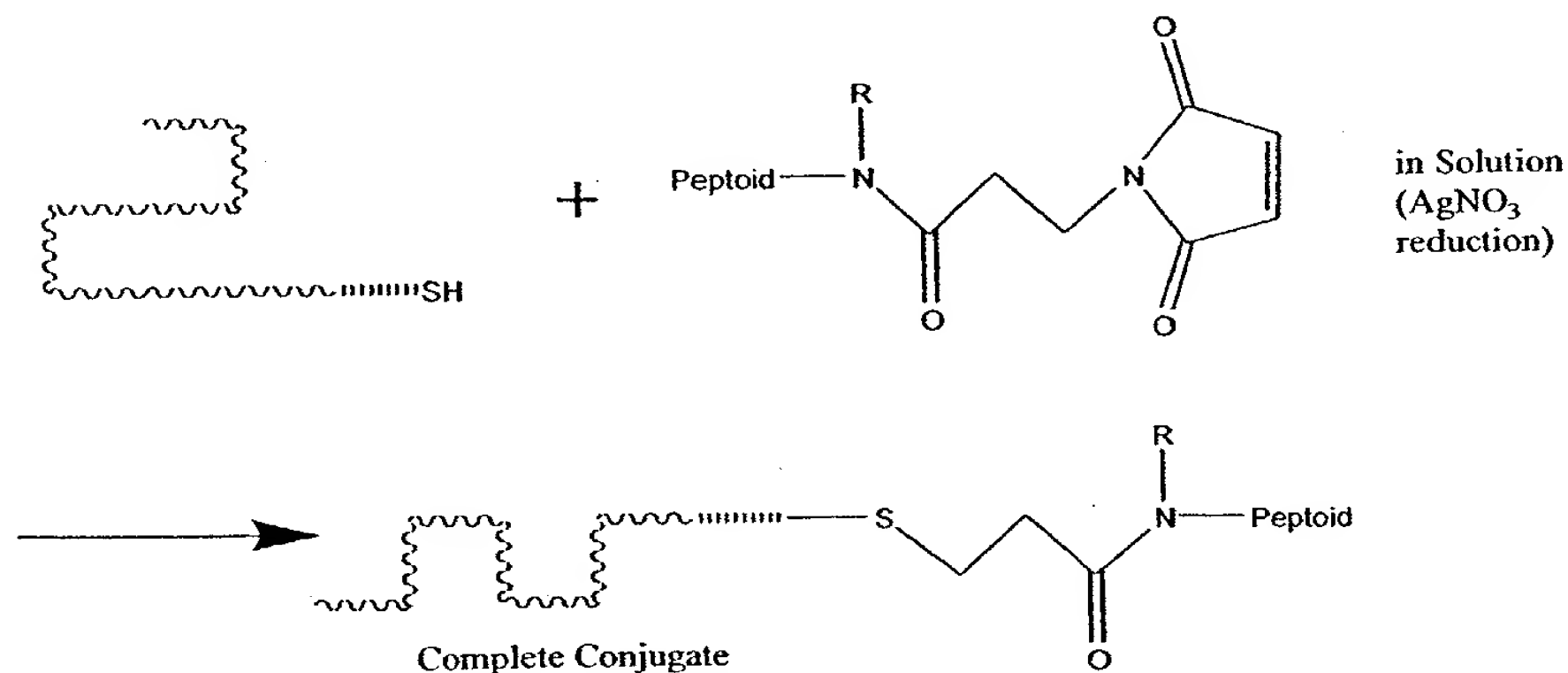


FIGURE 11D

0948637-07201

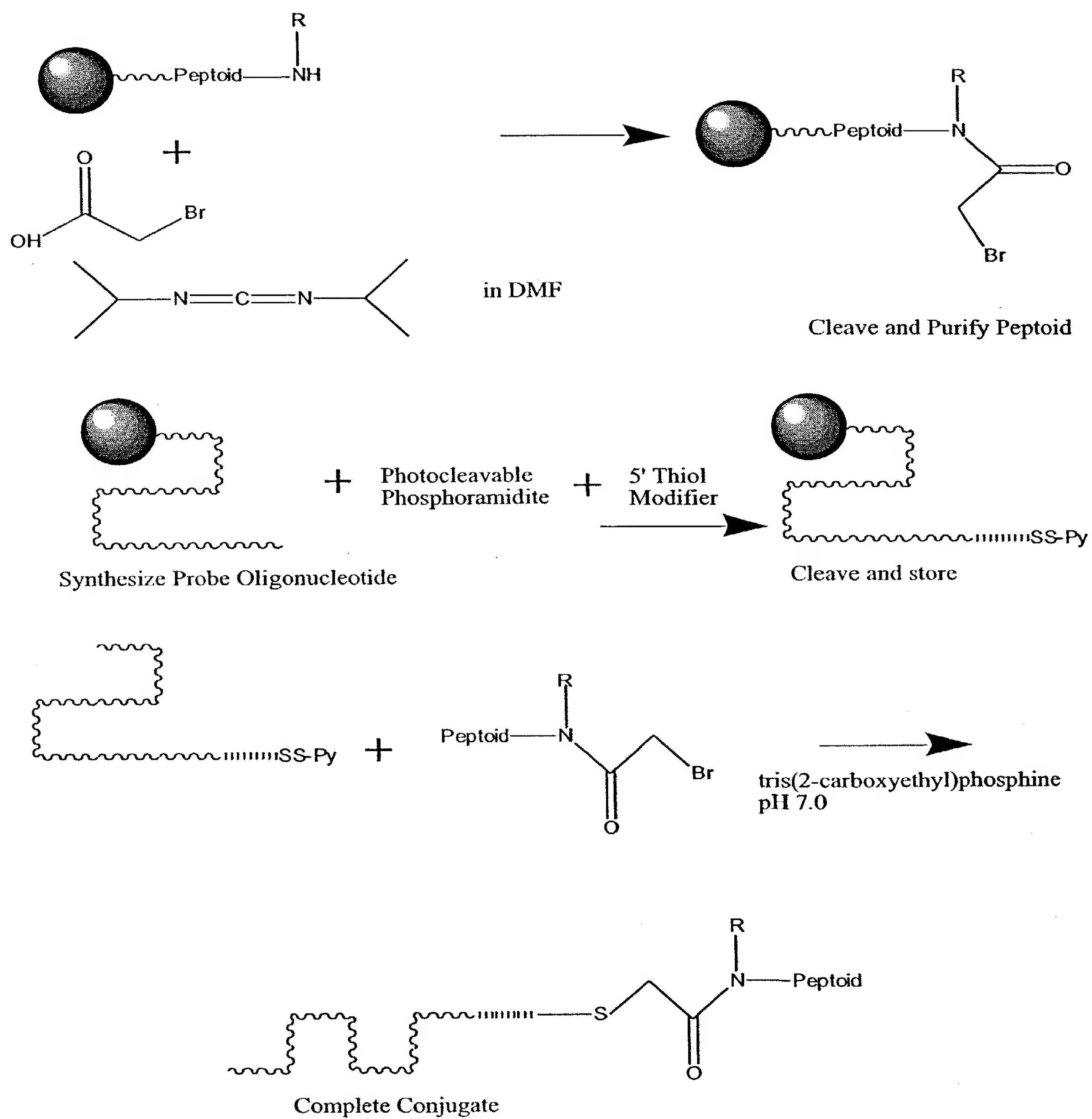
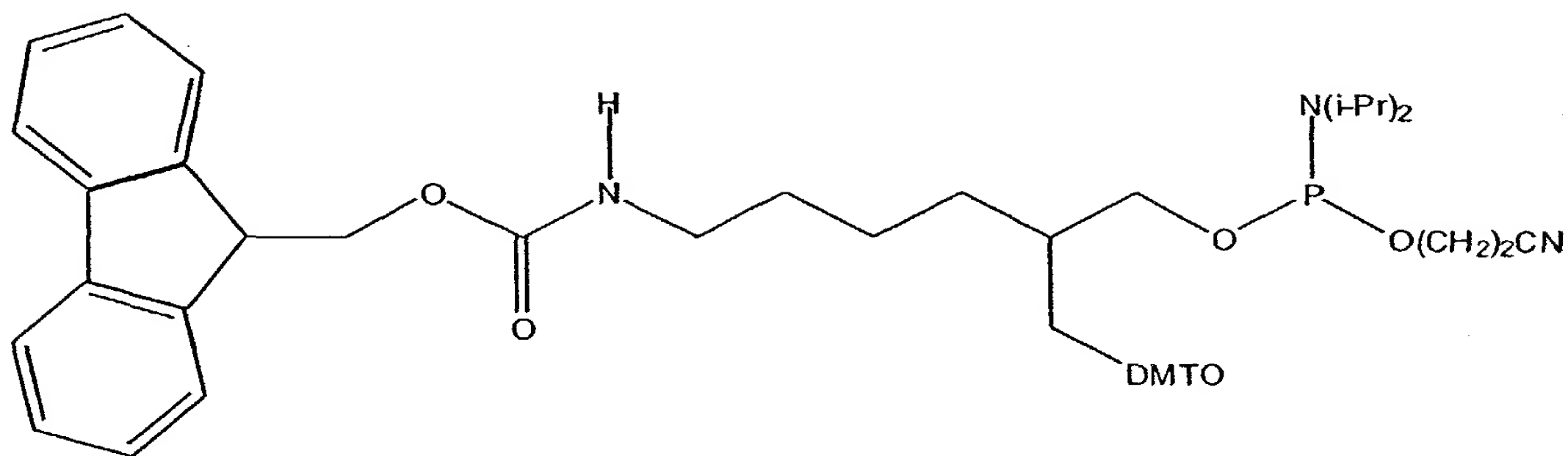


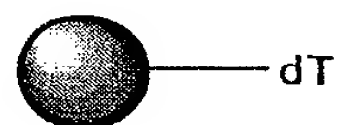
FIGURE 11E



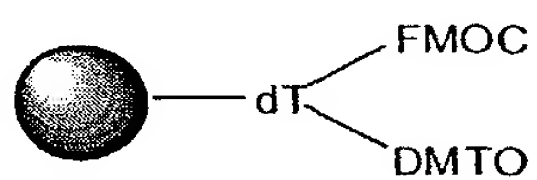
Clontech "Uni-Link AminoModifier" Branched Phosphoramidite

### Method

1. Obtain Oligonucleotide Resin with dT base



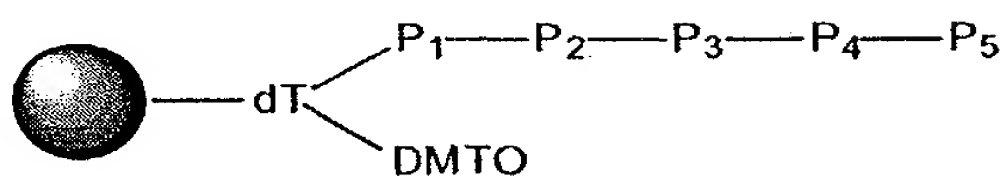
2. Add Branched Phosphoramidite



3. Transfer to Peptoid Synthesizer

4. Deprotect Fmoc

5. Add Peptoid



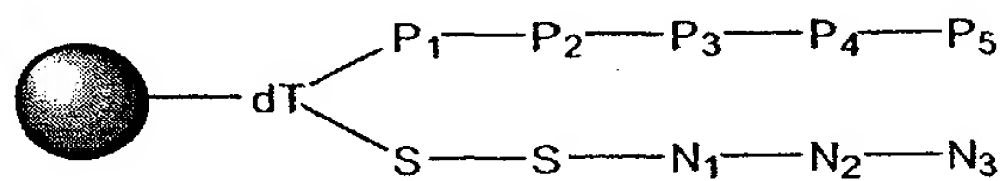
6. Protect Terminus

7. Return to ODN Synthesizer

8. Deprotect DMTO

9. Add cleavable units (Disulfide or Photocleavable)

10. Synthesize ODN



11. Deprotect and Cleave Completed Unit

FIGURE 12

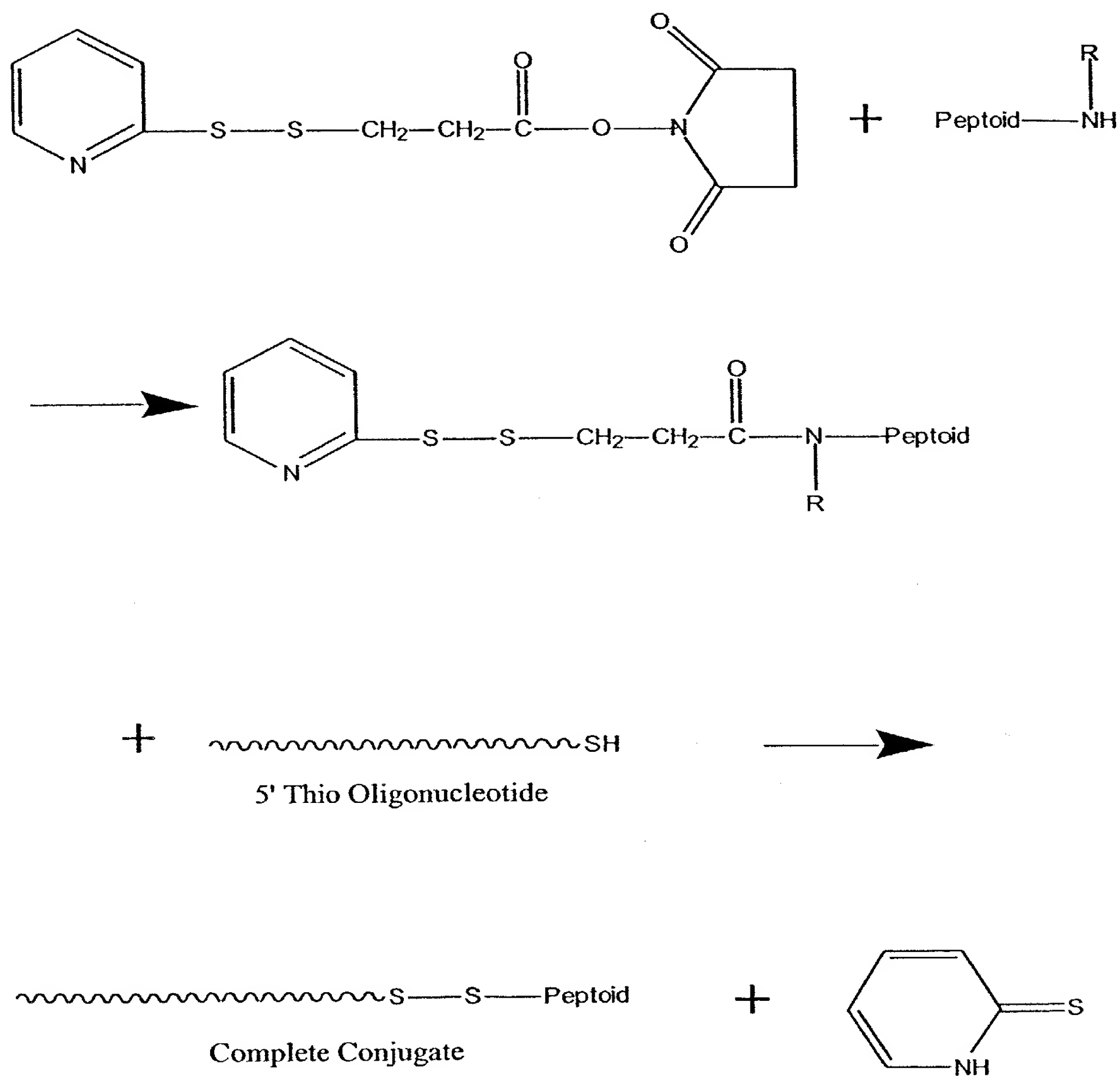


FIGURE 13

0948637.072704

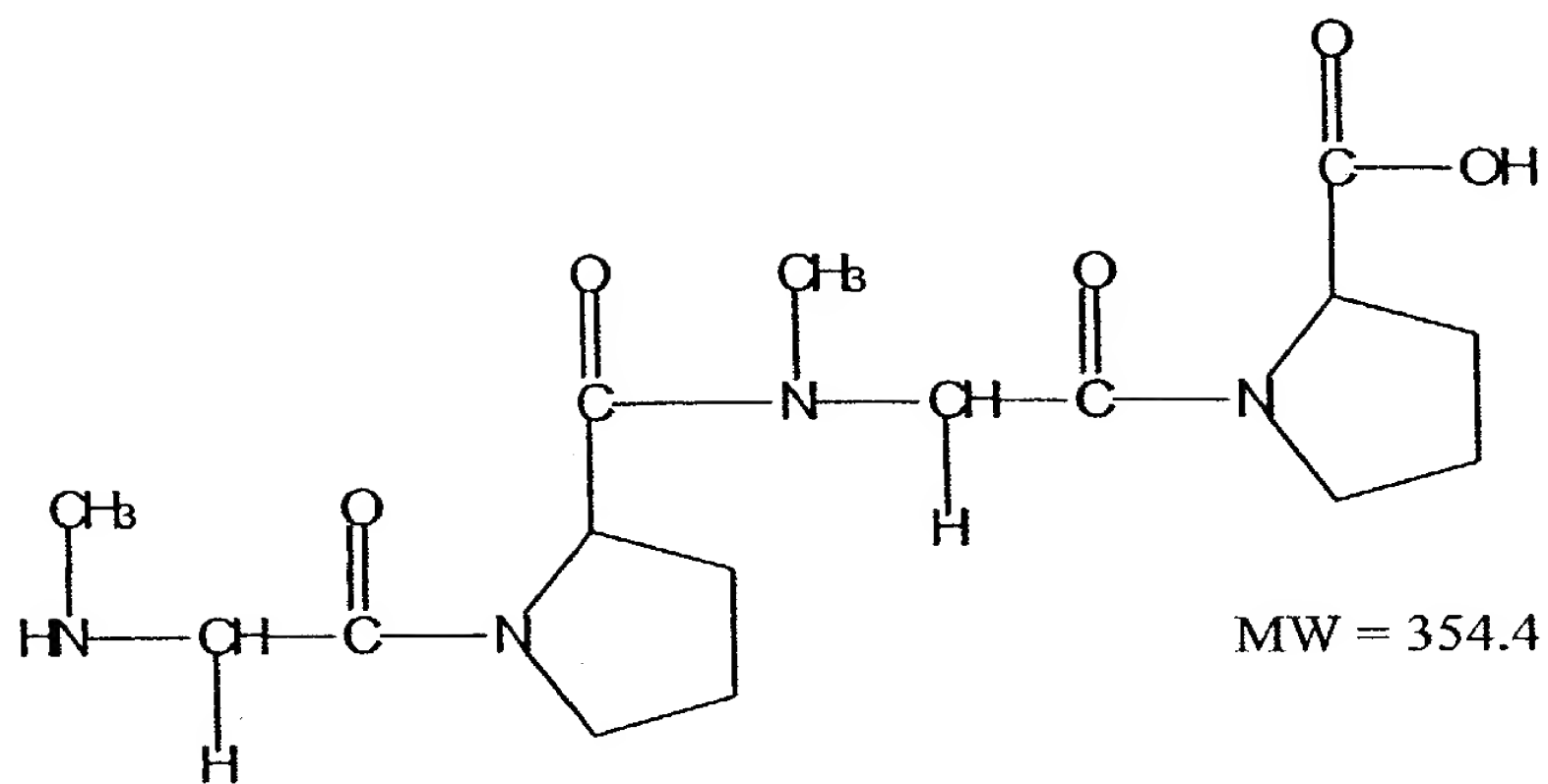


FIGURE 14



09948687-076701

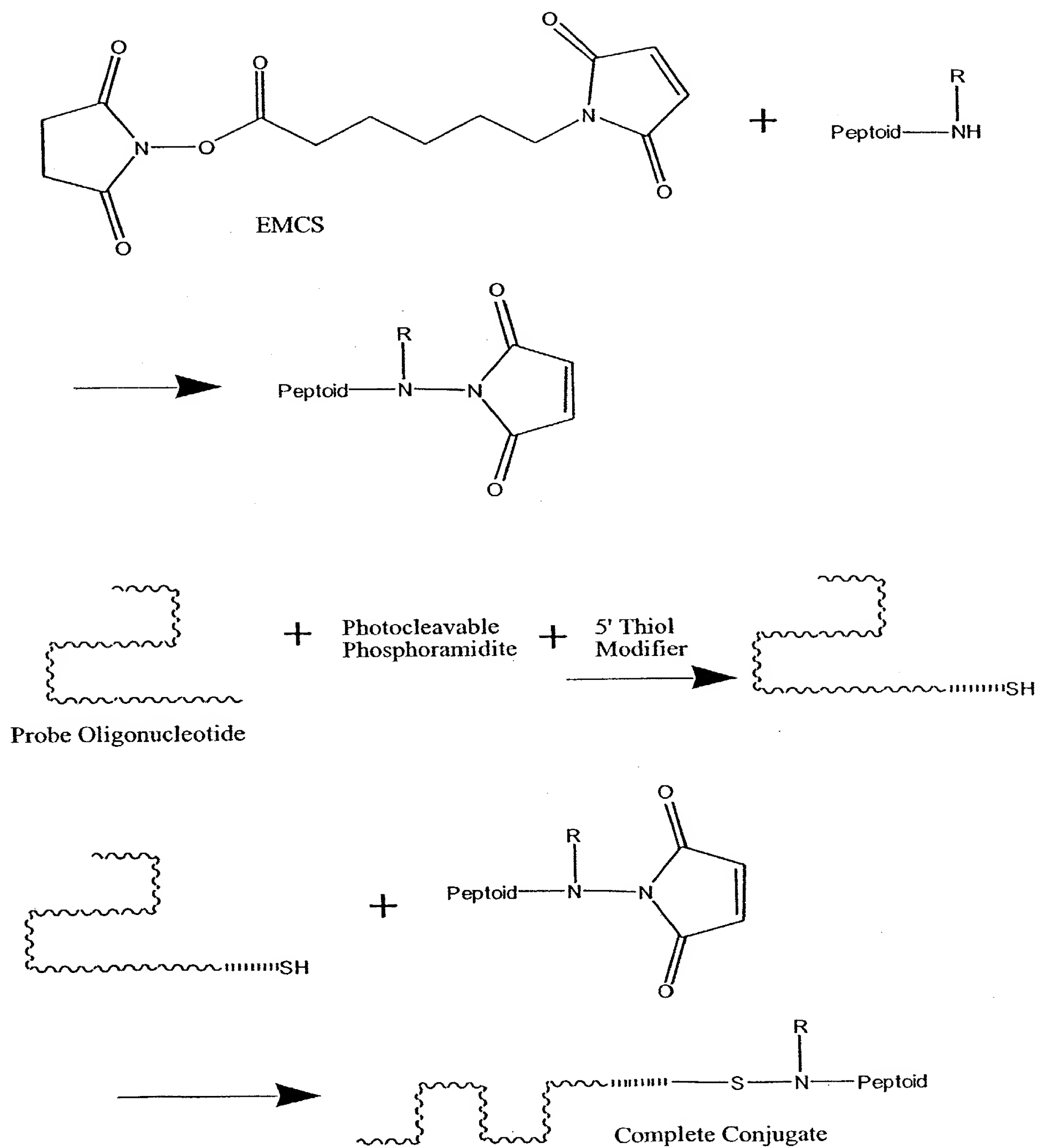
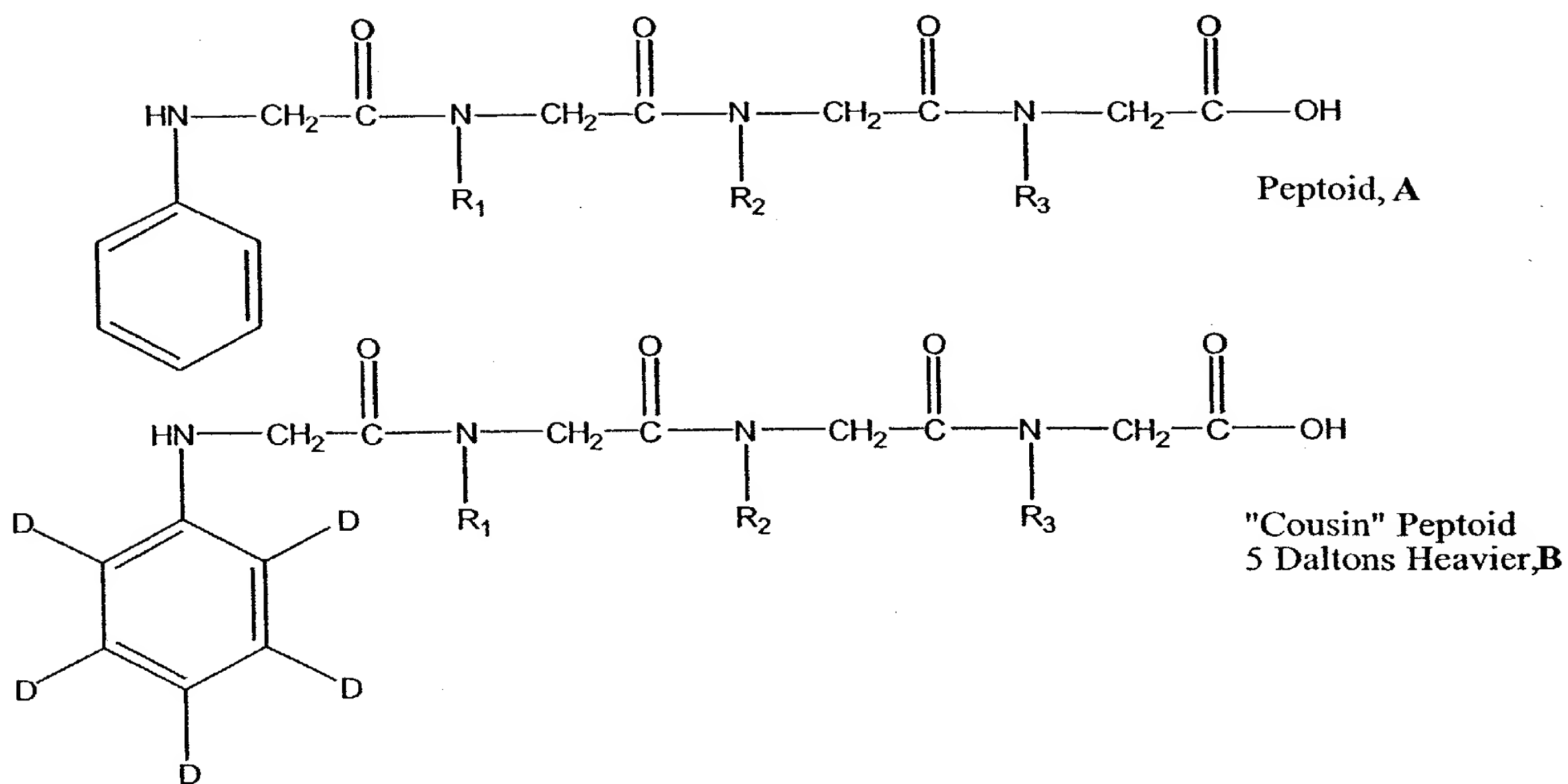


FIGURE 15

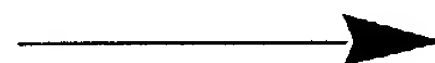
09918687-072701



Peptoid Library  
from mRNA  
interrogation  
(A-types)

+

Pre-quantitated  
"Cousin"  
Library  
(B-types)



Mass  
Spectrometer

Resulting Spectra  
Containing Duplexes

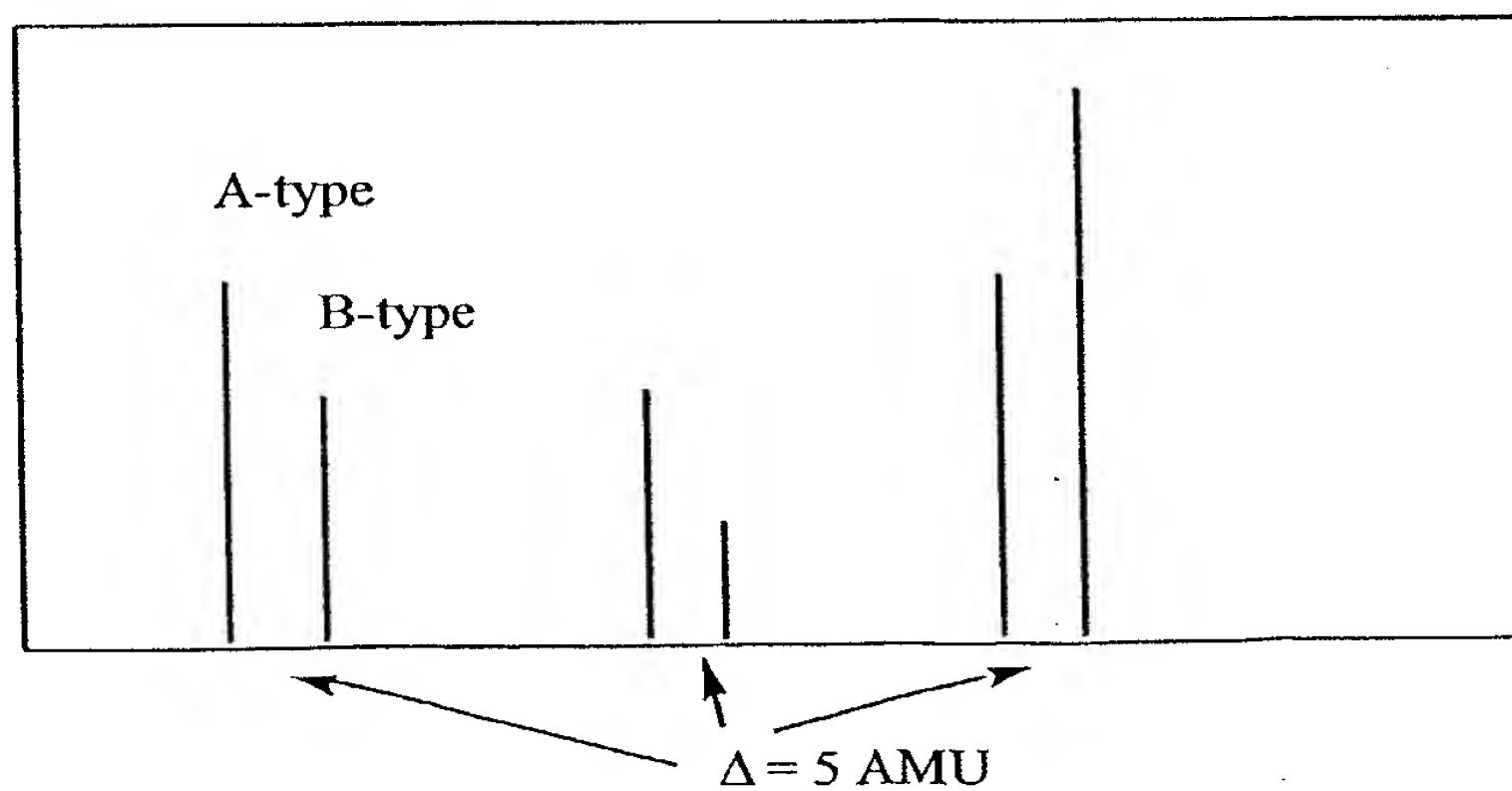
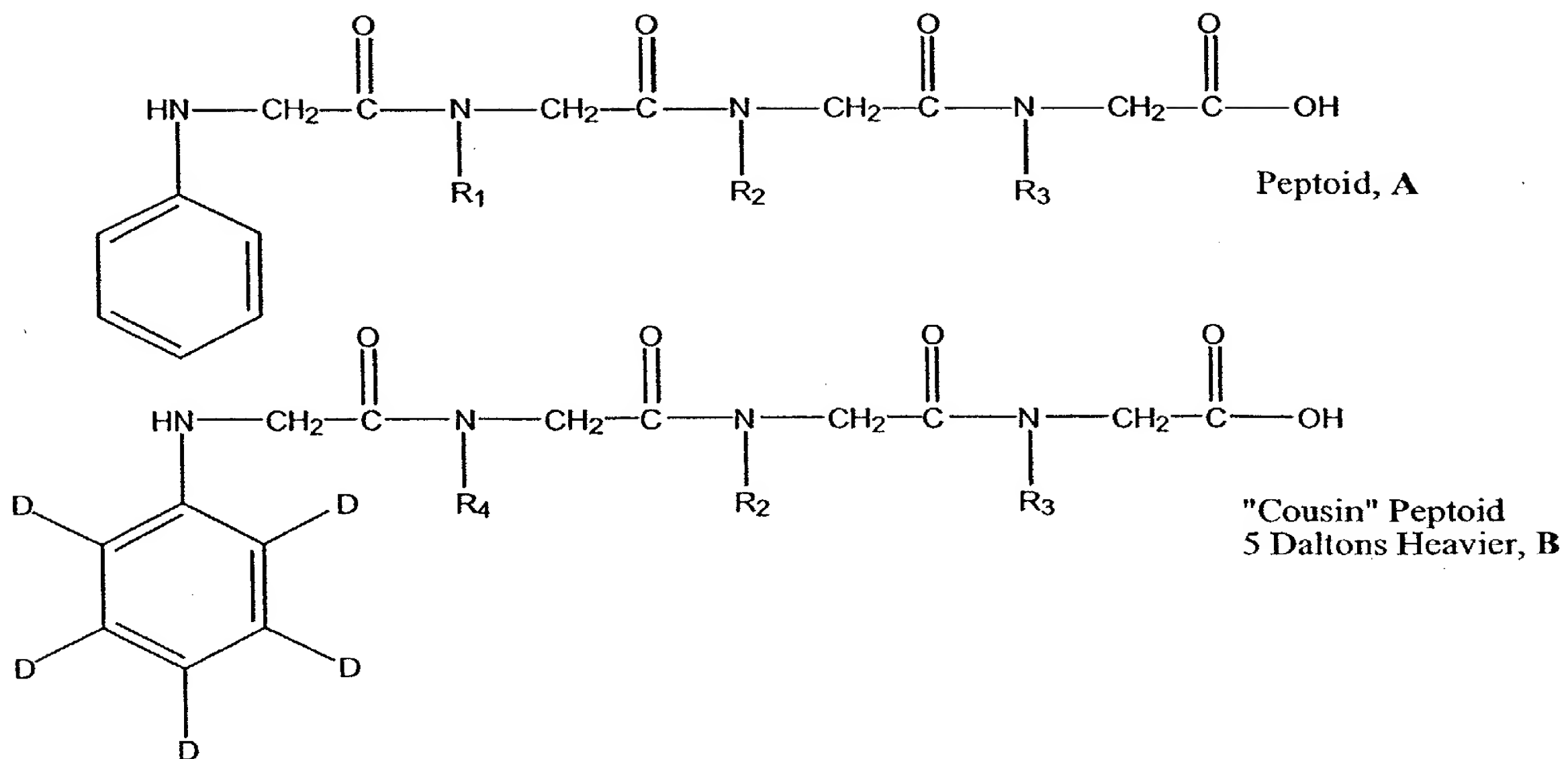


FIGURE 16

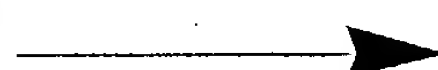
0918587 072701



Peptoid Library  
from mRNA  
interrogation  
(A-types)

+

Peptoid library  
from 2nd pool  
of mRNA  
(B-types)



Mass  
Spectrometer

Resulting Spectra  
Containing Duplexes

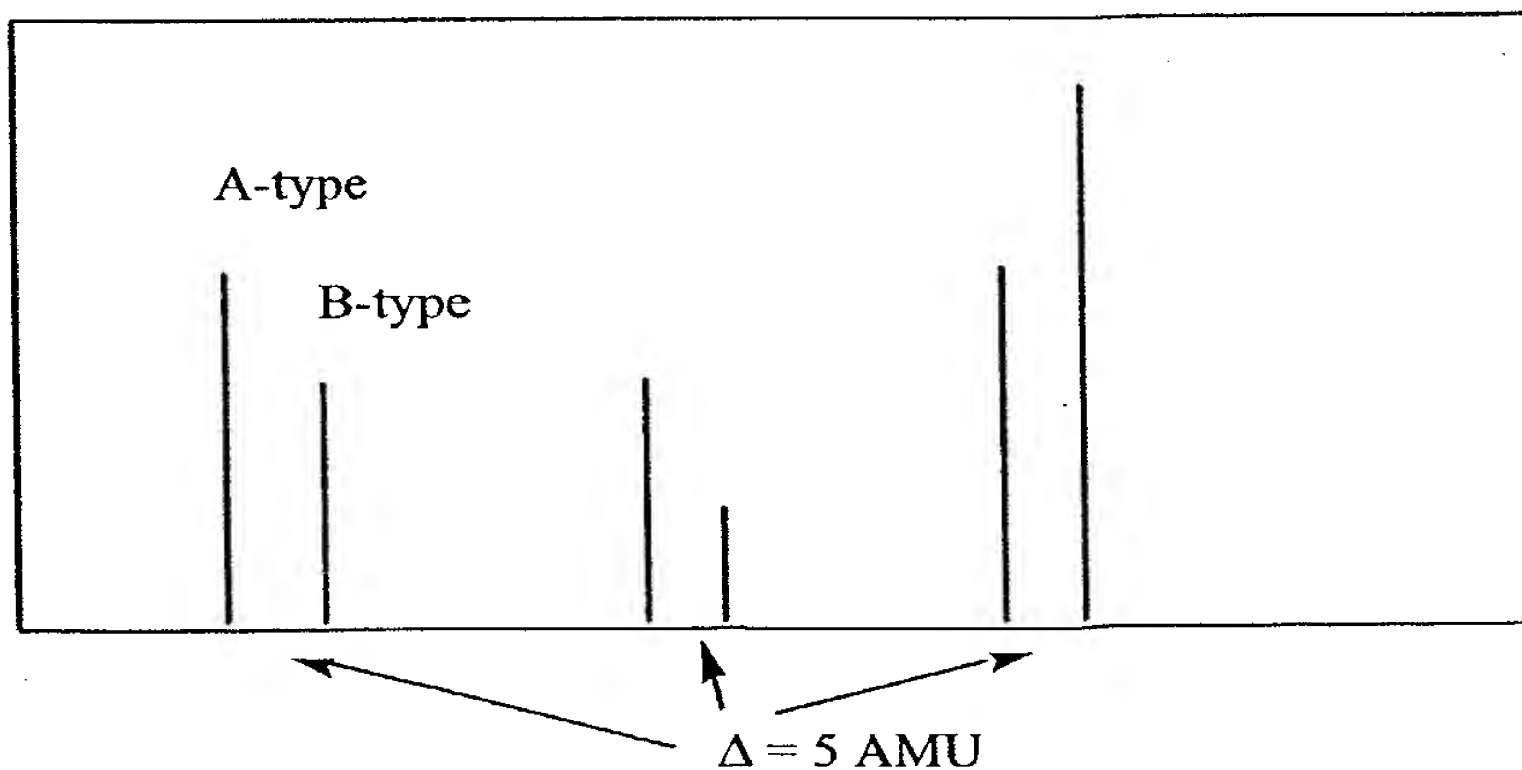


FIGURE 17.

09418687.07E701

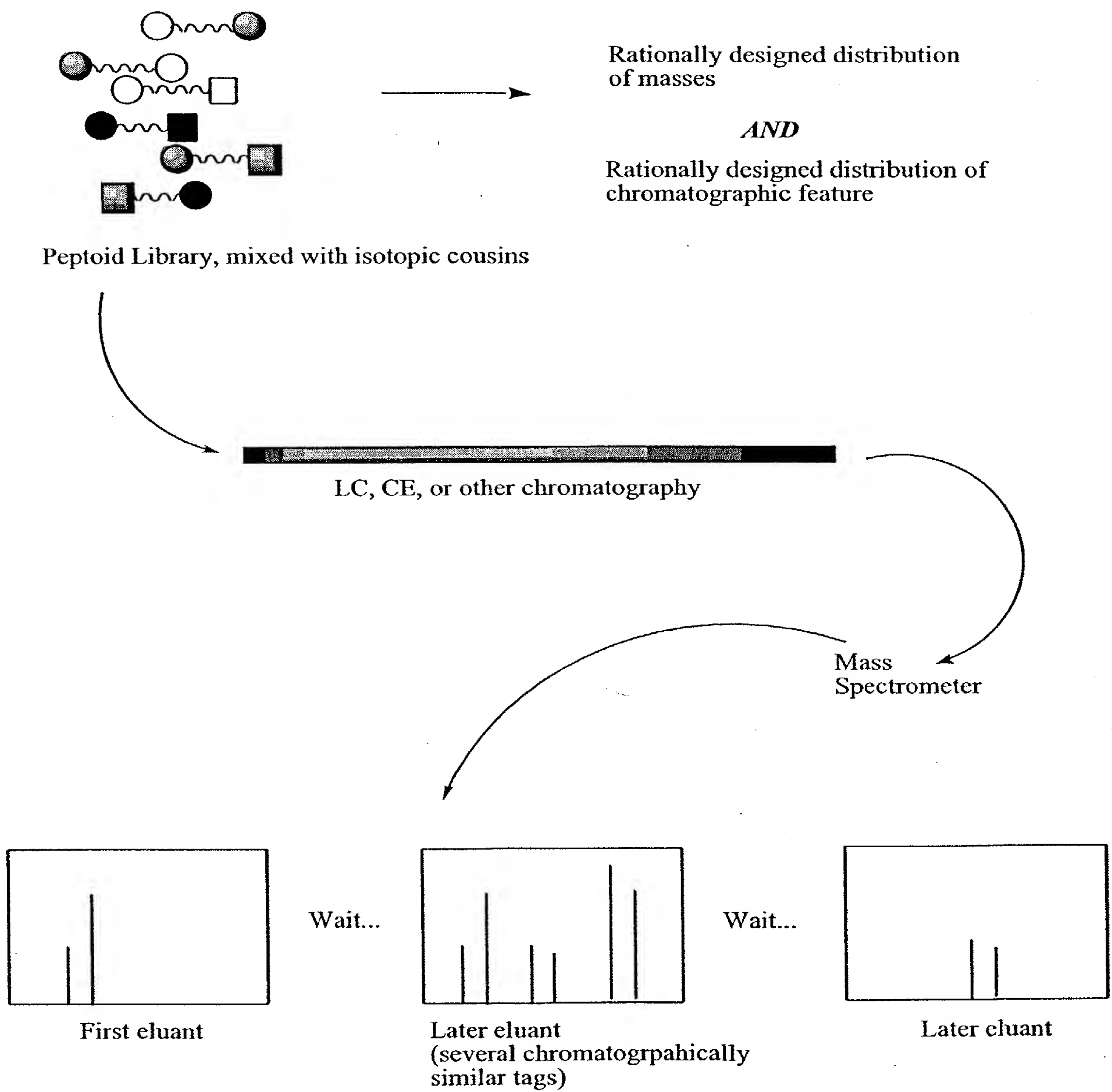
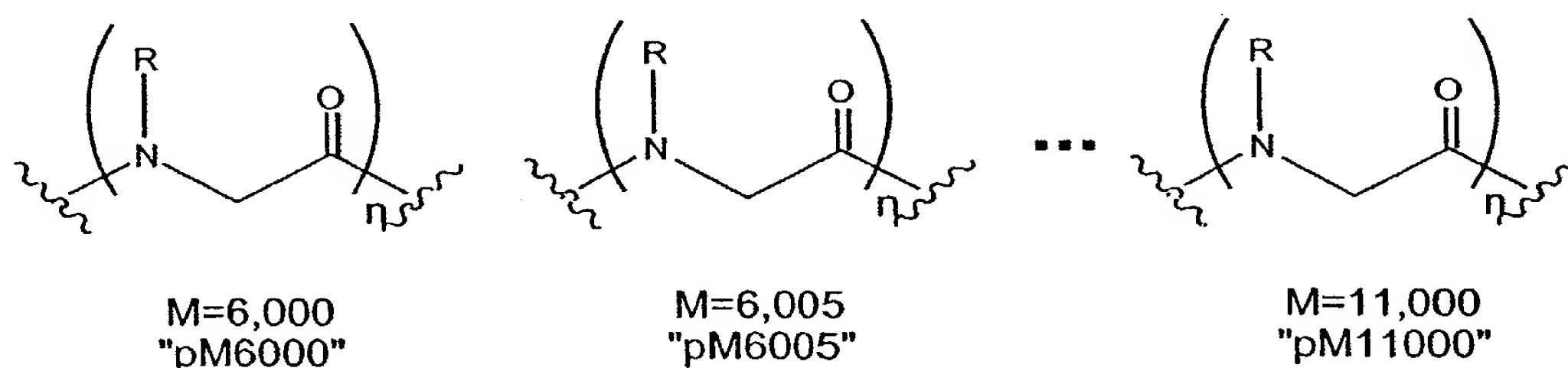


FIGURE 18

- 1) Synthesize and purify 1000 different peptoid oligomer mass tags, of mass 6,000 to 11,000 Daltons.



This will be performed by a robotic synthesizer on solid phase, with oligomer lengths of up to 40 residues. Molecular weights per residue will be 150-300 Daltons.

- 2) Synthesize and purify 16,000 different DNA oligos, complementary to the mRNA species to be detected. Create 16 libraries of 1,000 oligos each.

AA(NNNNNNNN)<sub>1</sub>, AA(NNNNNNNN)<sub>2</sub>, ..., AA(NNNNNNNN)<sub>1,000</sub>

AC(NNNNNNNN)<sub>1</sub>, AC(NNNNNNNN)<sub>2</sub>, ..., AC(NNNNNNNN)<sub>1,000</sub>

.....

TT(NNNNNNNN)<sub>1</sub>, TT(NNNNNNNN)<sub>2</sub>, ..., TT(NNNNNNNN)<sub>1,000</sub>

- 3) Specifically conjugate oligos in each library to a corresponding peptoid mass tag.

AA(NNNNNNNN)<sub>1</sub>/pM6000, AA(NNNNNNNN)<sub>2</sub>/pM6005, ..., AA(NNNNNNNN)<sub>1,000</sub>/pM11000

AC(NNNNNNNN)<sub>1</sub>/pM6000, AC(NNNNNNNN)<sub>2</sub>/pM6005, ..., AC(NNNNNNNN)<sub>1,000</sub>/pM11000

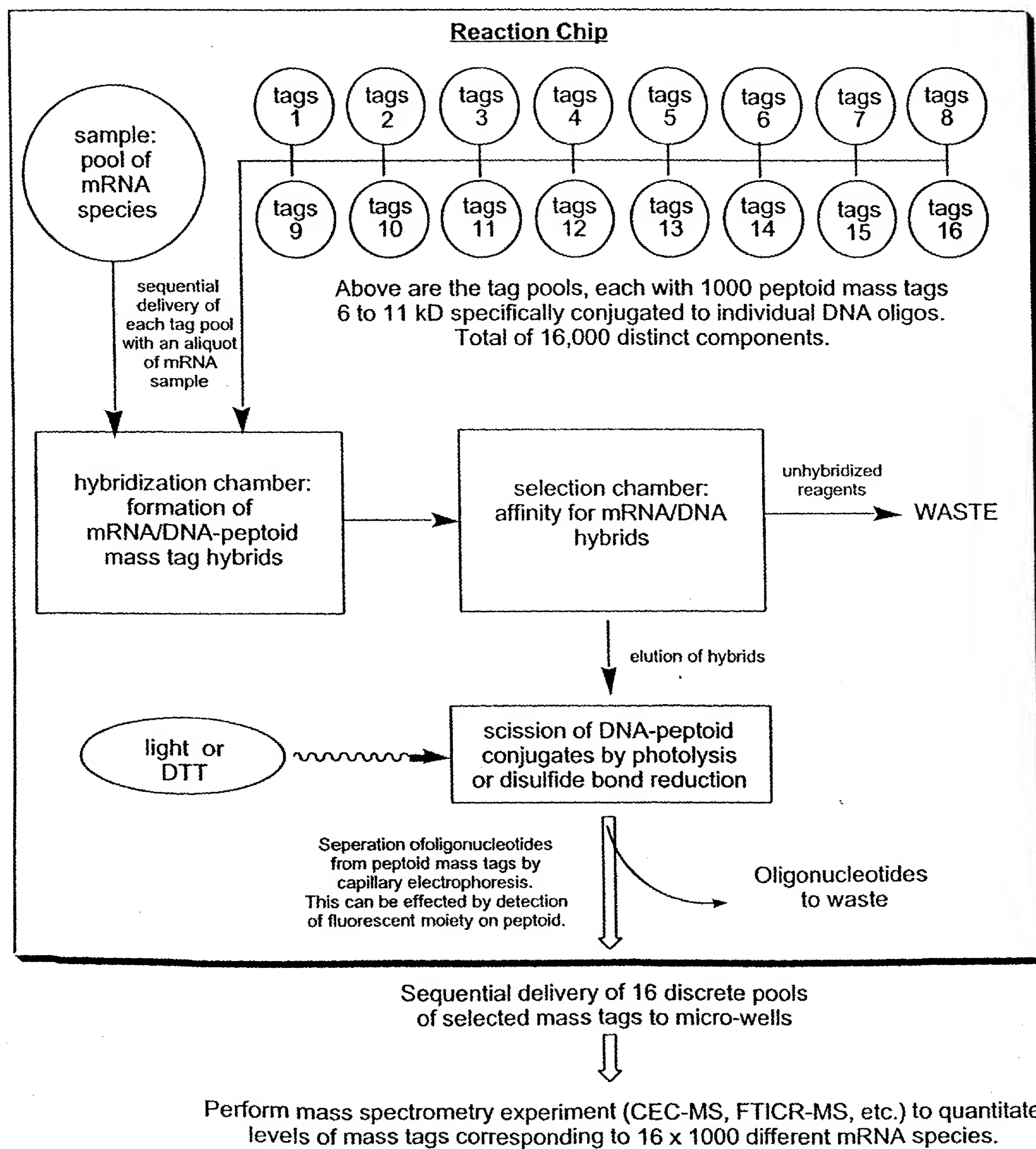
.....

TT(NNNNNNNN)<sub>1</sub>/pM6000, TT(NNNNNNNN)<sub>2</sub>/pM6005, ..., TT(NNNNNNNN)<sub>1,000</sub>/pM11000

- 4) Purify DNA/peptoid mass tag products and combine library elements into 16 pools.

**FIGURE 19**

**Mass-tagging on a chip:  
How to measure levels of 16,000 mRNA species in solution**



**FIGURE 20**

09918697-073704

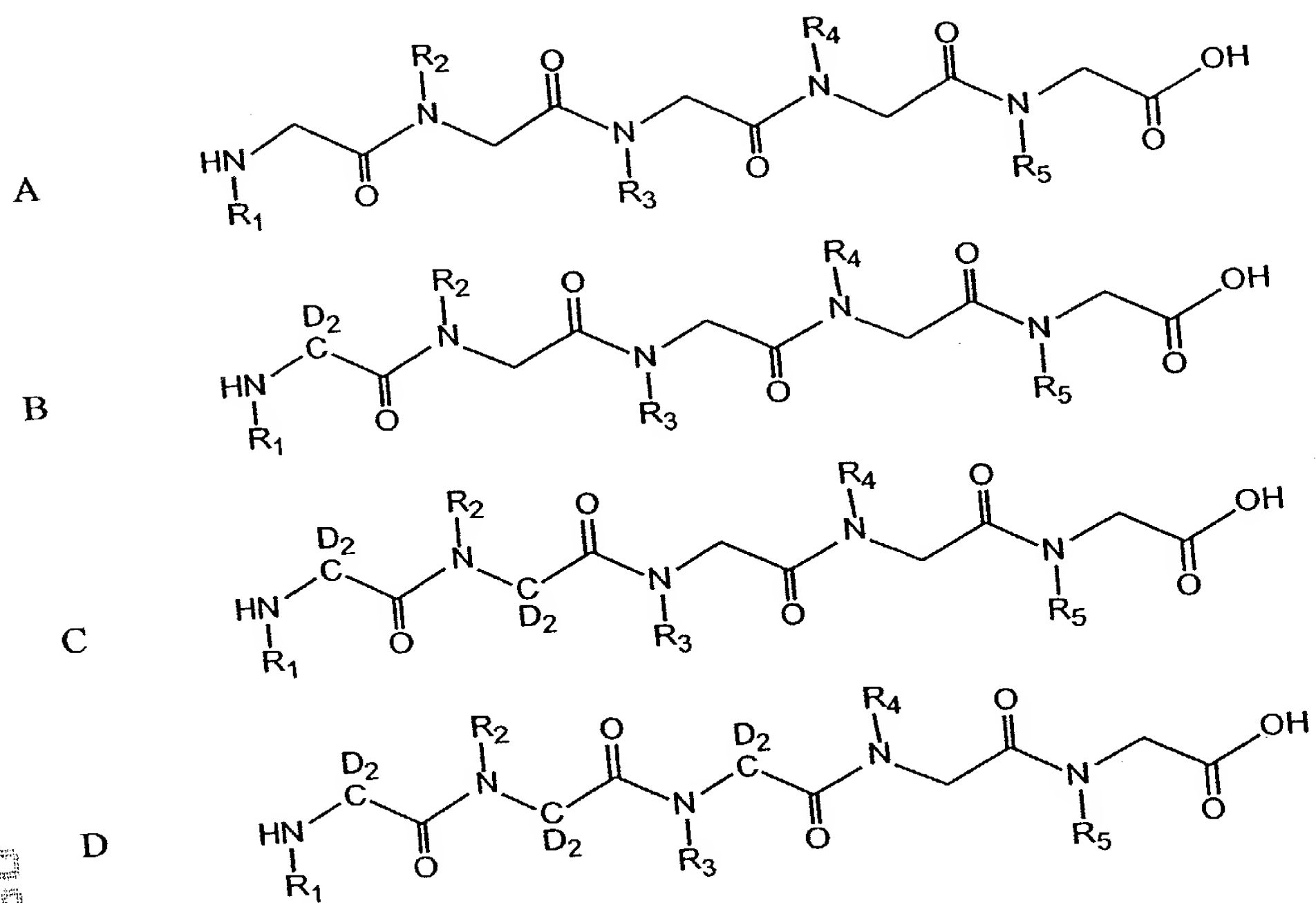


FIGURE 21

09918687-072701

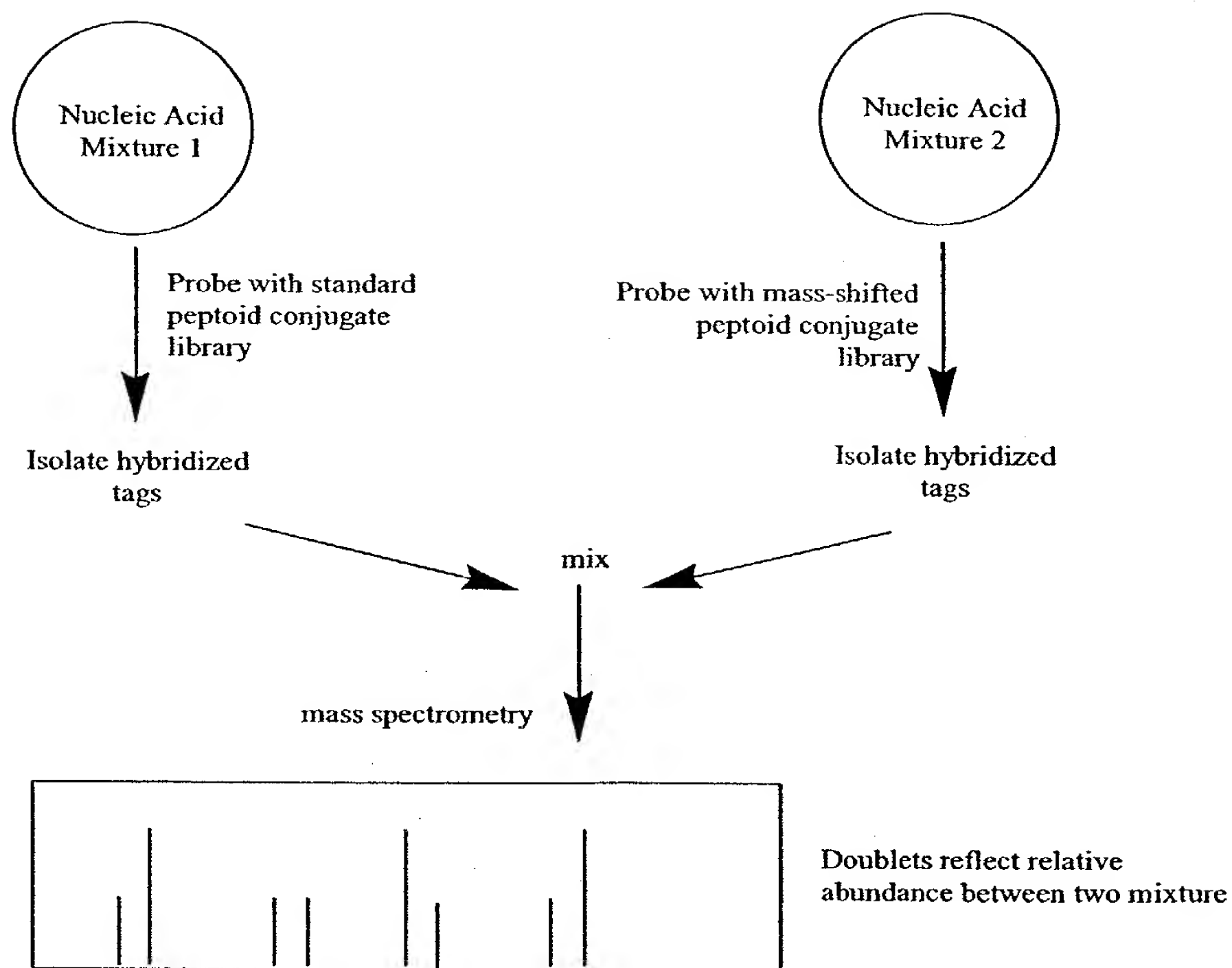


FIGURE 22



Mass spectrum of compound JFMP017. The x-axis represents Molecular Mass (m/z) and the y-axis represents intensity (%). The base peak is at m/z 735.3. Other significant peaks are labeled with their m/z values and chemical formulas.

| m/z    | Intensity (%) | Label               |
|--------|---------------|---------------------|
| 713.3  | ~10           | [M+H] <sup>+</sup>  |
| 715.3  | ~10           | [M+H] <sup>+</sup>  |
| 735.3  | 100           |                     |
| 736.3  | ~40           |                     |
| 737.3  | ~95           | [M+Na] <sup>+</sup> |
| 738.3  | ~35           |                     |
| 739.3  | ~15           |                     |
| 751.3  | ~25           | [M+K] <sup>+</sup>  |
| 753.2  | ~25           | [M+K] <sup>+</sup>  |
| 754.3  | ~15           | [M+K] <sup>+</sup>  |
| 1.9E+4 | ~100          |                     |

### FIGURE 23